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Monograph

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Issid planthoppers from Bach Ma and Phong Dien in Central Vietnam. I. Tribe Parahiraciini (Hemiptera: Fulgoromorpha: Issidae)

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Abstract. Eight species of Issidae (Hemiptera: Fulgoromorpha) belonging to the tribe Parahiraciini, were collected in recent years in Bach Ma National Park and Phong Dien District in Thừa Thiên-Huế Province in Central Vietnam. A new genus *Cyclopissus* gen. nov. is erected to accommodate a new species *Cyclopissus corticalis* gen. et sp. nov. from Bach Ma National Park. Three new species of the genus *Flavina* Stål, 1861 are described: *F. bachmana* sp. nov. from Bach Ma National Park and Da Krong Nature Reserve (Quang Tri Province), and *F. lami* sp. nov. and *F. quangi* sp. nov. from Bach Ma. Two new species of the genus *Pseudochoutagus* Che, Zhang & Wang, 2011 are described: *Ps. lindae* sp. nov. from Bach Ma and *Ps. trungi* sp. nov. from Phong Dien. One new species of the genus *Pusulissus* Bourgoïn & Wang, 2020, *Pu. bachmaensis* sp. nov., is described from Bach Ma. *Gelastyrella litaoensis* Yang, 1994 is recorded from Quang Tri and Thừa Thiên- Huế provinces in Central Vietnam and from Thanh Hoa and Ninh Binh provinces in North Vietnam, for the first time. These eight species represent the first records of the family Issidae for Thừa Thiên-Huế Province and hence, the Vietnamese fauna now counts 58 species in 13 genera. An identification key to the Vietnamese genera of Parahiraciini is given.

Keywords. Bach Ma National Park, biodiversity, Fulgoroidea, Indochina, Phong Dien District.

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Introduction

Among the planthoppers (Hemiptera, Fulgoromorpha), the family Issidae Spinola, 1839 is one of the larger families, and currently contains more than 1100 species in about 230 genera (Bourgoin 2024), representing about eight percent of the species of Fulgoromorpha Evans, 1946. Although it has a worldwide distribution, the fauna of some major regions such as tropical Africa, New Guinea or Australia, remains very poorly documented (Gnezdilov & Fletcher 2010; Gnezdilov 2013; Gnezdilov *et al.* 2022; Constant & Semeraro 2023).

The Issidae fauna of Vietnam currently counts 51 species, and a complete checklist was recently published (Constant & Pham 2024). The same study showed a high level of endemism of the Vietnamese issid planthoppers, with 70% of the species found in the country, known only from Vietnam. However, the study also pointed out a great need for research, as no species of Issidae is documented from $\frac{2}{3}$ of the provinces in the country.

If compared with the neighbouring countries, the fauna of Vietnam is better documented than that of Laos (six species recorded – Gnezdilov 2014; Constant 2021; Bourgoin 2024) or Cambodia (three species – Constant & Bartlett 2019), but much less than that of China (about 180 species – Zhang *et al.* 2020; Bourgoin 2024). The recent progress in the knowledge of the family Issidae in Vietnam is impressive; however, considering the expected higher endemism rate in mountainous areas, and from the material still unidentified/undescribed in the collections, it was estimated that current numbers don't exceed 15% of the actual diversity (Constant & Pham 2024).

Our study of recent material of Issidae collected during fieldwork in Bach Ma National Park and Phong Dien District in Thừa Thiên-Huế Province in Central Vietnam, revealed a total of eight species belonging to the tribe Parahiraciini Cheng & Yang, 1991 of the subfamily Issinae. Among these, seven were found to be new to science, with one representing a new genus. So far, no species of Issidae was recorded from this province (Constant & Pham 2024). The most recent checklist of Parahiraciini from Vietnam gives 16 species for the country, with 12 (75%) of them having been described or recorded after 2010 (Gnezdilov 2011, 2015, 2017; Gnezdilov & Constant 2012; Gnezdilov *et al.* 2014a; Vanslebrouck & Constant 2018; Bourgoin & Wang 2020; Constant & Pham 2023, 2024).

The present paper aims to describe one new genus and seven new species, and to update the distribution of *Gelastyrella litaoensis* Yang, 1994. It is the first part of a complete study of the Issidae from Bach Ma National Park and Phong Dien District, the following parts dealing with the tribes Hemisphaeriini Melichar, 1906 and Sarimini Wang, Zhang & Bourgoin, 2016, respectively.

Material and methods

The specimens were captured by hand using small transparent vials with which they were slowly covered or by sweeping the lower vegetation, bushes and lower branches of trees in the forest, along trails, or along the road.

The photographs of habitats and live specimens were taken with an Olympus Tough 6 camera. Some specimens were placed in a fine mesh cage when necessary but in this case, it is mentioned in the caption. The collection specimens were photographed with a Leica EZ4W stereo microscope with integrated camera, and the images were stacked with CombineZ software and optimized with Adobe Photoshop CS3; all photographs are by JC. The distribution maps were produced with SimpleMappr (Shorthouse 2010).

The genitalia were extracted after soaking the abdomen in a 10% solution of potassium hydroxide (KOH) at room temperature for about 12 hours. The pygofer was separated from the abdomen and the aedeagus dissected with a needle blade for examination. The whole was thoroughly rinsed in 70% ethanol, then placed in glycerine for preservation in a tube attached to the pin of the corresponding specimen. The hind wings were glued with white glue on a small white cardboard rectangle attached to the pin of the corresponding specimen.

The external morphological terminology follows O'Brien & Wilson (1985) and for the terminalia, Bourgoin & Huang (1990), Gnezdilov (2003) and Gnezdilov *et al.* (2014b). The metatibiotarsal formula represents the number of spines on (side of metatibia) apex of metatibia/apex of first metatarsus/apex of second metatarsus. The terminology of the wing venation follows Bourgoin *et al.* (2015). The classification used follows the most recent one published by Gnezdilov *et al.* (2022).

Abbreviations

Measurements

The measurements were taken as in Constant (2004) and the following abbreviations are used:

- BB = maximum breadth of the body
- BF = maximum breadth of the frons
- BTg = maximum breadth of the tegmen
- BV = maximum breadth of the vertex
- BW = maximum breadth of the hind wing
- LF = length of the frons in median line
- LT = total length (apex of head to apex of tegmina)
- LTg = maximum length of the tegmen
- LV = length of the vertex in median line
- LW = maximum length of the hind wing

Female terminalia

- St VII* = sternum VII

Male terminalia

- ae* = aedeagus
- An* = anal tube
- ca* = capitulum of the gonostylus
- co* = connective of the aedeagus
- dl* = dorsal lobe of the periandrium
- G* = gonostylus
- ll* = lateral lobe of the periandrium
- lvp* = lateroventral process of the aedeagus
- Py* = pygofer
- te* = tectiductus of the aedeagus
- vl* = ventral lobe of the periandrium

Repositories

- RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium
- VNMN = Vietnam National Museum of Nature, Hanoi, Vietnam

Results

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Suborder Auchenorrhyncha Duméril, 1806
Infraorder Fulgoromorpha Evans, 1946
Superfamily Fulgoroidea Latreille, 1807
Family Issidae Spinola, 1839
Subfamily Issinae Spinola, 1839
Tribe Parahiraciini Cheng & Yang, 1991

Subtribe **Parahiraciina** Cheng & Yang, 1991

Type genus

Parahiracia Ôuchi, 1940 (junior synonym of *Fortunia* Distant, 1909).

Diagnosis

All Vietnamese Parahiraciini belong to the subtribe Parahiraciina (Bourgoin & Wang 2020; Bourgoin 2024), which was defined by Bourgoin & Wang (2020) based on a combination of characters of the hind wings:

- (1) hindwings bilobate, strongly notched at CuP with CuP-Pcu-A1 lobe generally wider than Sc-R-MP-CuA lobe; the two lobes almost the same length;
- (2) posterior margin of hindwings not or indistinctly notched at A1₂;
- (3) A2 lobe of hindwings with anal area posterior to A1 strongly reduced, much shorter and much thinner than the anterior lobes;
- (4) hindwings with Sc-R-MP-CuA and CuP-Pcu-A1 lobes covered with a set of numerous transverse veins;
- (5) hindwings with CuA and CuP not merging before the anterior notch;
- (6) hindwings with Pcu and A1₁ not merging in basal half of forewing;
- (7) hindwings with A2 present, not branched or absent. In some species, a transverse a2-a1 connecting A2 with A1 at the level of its basal branching (e.g., in *Tetricodes tamdaoensis* Vanslebrouck & Constant, 2018).

Checklist of the Parahiraciini of Vietnam

Bardunia curvinaso Gnezdilov, 2011
Brevicopius gorochovi Gnezdilov, 2017
Brevicopius jianfenglingensis (Chen, Zhang & Chang, 2014)
Cyclopissus corticalis gen. et sp. nov.
Flavina acuta Ran & Liang, 2006
Flavina bachmana sp. nov.
Flavina lami sp. nov.
Flavina quangi sp. nov.
Fortunia byrrhoides (Walker, 1858)
Fortunia viridis (Lallemand, 1942)
Gelastyrella litaoensis Yang, 1994
Laohiracia acuta Constant, 2021
Pseudochoutagus lindae sp. nov.
Pseudochoutagus rubens Gnezdilov & Constant, 2012
Pseudochoutagus trungi sp. nov.
Pumatiracia venosa Constant & Pham, 2023

Pusulissus bachmaensis sp. nov.
Pusulissus phiaoacensis Bourgoïn & Wang, 2020
Pusulissus quangninhensis Constant & Pham, 2024
Rostrolatium curviceps Constant & Pham, 2024
Tetricodes pacoensis Vanslebrouck & Constant, 2018
Tetricodes tamdaoensis Vanslebrouck & Constant, 2018
Thabena frontocolorata Gnezdilov, 2015

Key to the genera of Parahiraciini of Vietnam

1. Head elongate, with vertex at least 1.2 times as long as wide (Fig. 29A; Constant & Pham 2023: fig. 2a) 2
 - Head not elongate, with vertex not more than 1.0 times as long as wide (Figs 8A, 20A) 5
2. Head moderately elongate, about 1.2 times as long as wide, not forming a distinct cephalic process (Constant & Pham 2023: fig. 2a); genae with strong carina under antennae (Constant & Pham 2023: fig. 2c–d) *Pumatiracia* Constant & Pham, 2023
 - Head strongly elongate, forming a distinct cephalic process (Fig. 29A); genae without infraocular carina (Fig. 29C–D) 3
3. Cephalic process downcurved (Constant & Pham 2024: fig. 28C)
 - Cephalic process straight or slightly upcurved apically (Fig. 29C) 4
4. Cephalic process straight in lateral view with dorsal and ventral longitudinal carinae obvious at least on distal half (Constant 2021: fig. 1f–i); eyes roundly projecting laterally (Constant 2021: fig. 1f); anterior margin of pronotum strongly projecting anteriorly (Constant 2021: fig. 1f); hind wings densely reticulate with vein Pcu strongly curved (Constant 2021: fig. 2b) *Laohiracia* Constant, 2021
 - Cephalic process is slightly curved dorsad in lateral view, with weak dorsal and ventral longitudinal carinae (Figs 25A–D, 29A–D); eyes weakly projecting laterally; anterior margin of pronotum is curved but not strongly projecting anteriorly (Figs 25A, 29A); hind wings moderately reticulate with vein Pcu weakly curved and well distinct (Figs 25E, 29E)
 - *Pseudochoutagus* Che, Zhang & Wang, 2011
5. Angle between vertex and frons obtuse or right, with frons projecting anteriorly, visible in dorsal aspect (Constant & Pham 2024: fig. 37c–d; Gnezdilov 2017: figs 40, 42) 6
 - Angle between vertex and frons more or less strongly acute, with frons not visible in dorsal aspect (Figs 8A, C, 20A, C) 8
6. Tegmina with hypocostal plate 7
 - Tegmina without hypocostal plate *Bardunia* Stål, 1863
7. Frons rather short and wide; right angle between vertex and frons; dorsal margin of frons concave (Gnezdilov 2017: figs 40, 42–43) *Brevicopius* Meng, Qin & Wang, 2015
 - Frons rather elongate and narrow; obtuse angle between vertex and frons; dorsal margin of frons straight (Constant & Pham 2024: fig. 37c–d, g–h) *Fortunia* Distant, 1909
8. Frons with large, black, oculiform, shiny marking in the dorsal portion (Fig. 4B) 9
 - Frons without black, oculiform marking in the dorsal portion (Figs 8B, 20B) 10

9. CuA vein of the tegmen straight and reaching the hind margin of the tegmen (Fig. 3A, C); capitulum of the gonostyli with a rather long neck (Fig. 5A–B); aedeagus with a pair of elongate symmetrical, lateroventral processes projecting caudad (Fig. 5E) *Cyclopissus* gen. nov.
– CuA vein of the tegmen sinuate and not reaching the hind margin (Vanslebrouck & Constant 2018: fig. 1a, e); capitulum of the gonostyli with a short neck (Vanslebrouck & Constant 2018: fig. 2a); aedeagus without lateroventral processes (Vanslebrouck & Constant 2018: fig. 2c)
..... *Tetricodes* Fennah, 1956
10. Vertex transverse, at least about twice as wide as long in midline (Fig. 20A) 11
– Vertex subquadrate, about 1.1 times as wide as long in midline (Fig. 8A) *Flavina* Stål, 1861
11. Frons about as long a wide, with median carina and a transverse carina under the dorsal margin (Fig. 20B); aedeagus rather complex with multiple lobes and processes (Fig. 21E–J) 12
– Frons elongate, at least 1.2 times as long in midline as wide, with median carina extending from dorsal margin almost to frontoclypeal suture and without transverse carina under dorsal margin (Fig. 33B); aedeagus rather simple, with a single pair of ventral processes curved anterodorsad (Fig. 34F–K) *Pusulissus* Bourgoïn & Wang, 2020
12. Suspensorium well developed; ventral lobe of periandrium strongly convex in lateral view (Fig. 21E–J) *Gelastyrella* Yang, 1994
– Suspensorium small; ventral lobe of periandrium straight in lateral view (Zhang *et al.* 2020: figs 148h, 150h) *Thabena* Stål, 1866

Genus *Cyclopissus* gen. nov.

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Type species

Cyclopissus corticalis gen. et sp. nov., by present designation.

Diagnosis

The genus is characterized and separated from all other Parahiraciini genera by the following combination of characters:

- (1) head with vertex about two times as wide as long in midline, not projecting anteriorly;
- (2) frons with a large oculiform black, shiny marking in dorsal portion, and a median carina in ventral portion;
- (3) genae without strong carina under the antennae;
- (4) body oval in dorsal aspect, less than twice as long as maximum width;
- (5) metatibiae with two lateral and seven apical spines;
- (6) tegmina with vein CuA straight, unbranched and reaching the hind margin of the tegmen;
- (7) anal tube of male dorsoventrally flattened, subhexagonal in dorsal view and with apical angles projecting ventrad;
- (8) gonostyli with capitulum rather strongly projecting dorsad, with a rather long neck;
- (9) aedeagus evenly curved in lateral view, with a pair of elongate symmetrical, lateroventral processes projecting caudad.

Differential diagnosis

The most similar genus is *Tetricodes*, which also shows a large, black, oculiform, shiny marking in the dorsal portion of the frons, an oval body, the vertex wider than long, and two lateral spines on the metatibiae (see Vanslebrouck & Constant 2018: figs 1, 4). However, *Cyclopissus* gen. nov. can be separated by the CuA vein of the tegmen straight and reaching the hind margin of the tegmen (sinuate and

not reaching the margin in *Tetricodes*), the capitulum of the gonostyli with a rather long neck (short neck in *Tetricodes*) and the aedeagus with a pair of elongate symmetrical, lateroventral processes projecting caudad (lateroventral processes of the aedeagus absent in *Tetricodes*) (compare with Vanslebrouck & Constant 2018: figs 1, 2, 4, 6).

Etymology

The new genus name is formed by the combination of ‘*Cyclops*’, referring to the one-eyed giant from Greek and Roman mythology, and ‘*Issus*’, the type genus of the family Issidae. It refers to the large oculiform black, shiny marking in the dorsal portion of the frons and the family placement of the new genus. The gender is masculine.



Fig. 1. Map of the sampled localities in Thừa Thiên-Huế Province, Vietnam.

Description

HEAD (Fig. 4A–D). Head slightly narrower than thorax. Vertex wider than long, medially grooved, with sides subparallel; anterior and posterior margins subparallel and curved; all margins weakly carinate. Frons elongate with large oculiform black, shiny marking in dorsal portion, median carina in ventral portion and tubercles along lateral margins under midheight of eye. Clypeus flat in middle portion, moderately elongate, subtriangular with fronto-clypeal suture rounded; anteclypeus with median blunt carina. Labium elongate and narrow, reaching metacoxae, with apical segment elongate, nearly as long as penultimate. Eyes reniform (not emarginate); ocelli absent. Antennae rather short with scape ring-shaped and pedicel cylindrical, slightly longer than broad.

THORAX (Fig. 4A–D). Pronotum slightly shorter than mesonotum in midline; anterior margin carinate in middle portion, strongly sinuate and strongly, roundly protruding anteriorly between eyes; posterior margin nearly straight, slightly carinate in middle portion; median carina obsolete anteriorly with impressed point on each side; blunt tubercles along anterior margin and irregularly on disc and sides; paranotal lobes (lateral view) broad, with tubercles along posterior margin, and with posteroventral angle rounded. Mesonotum subtriangular with obsolete median carina and weak peridiscal carinae. Tegulae moderately developed, medium sized.

TEGMINA (Fig. 3A–C). Tegmina subcoriaceous with longitudinal veins slightly elevated and with rather dense reticulum of veinlets, elongate with sides broadly rounded, slightly more than 2 times as long as



Fig. 2. Typical habitats in Bach Ma National Park, May 2023. **A.** Pheasant trail. **B.** Roadside (1200–1300 m a.s.l.). **C.** Rhododendron trail. **D.** Summit (1300–1400 m a.s.l.).

broad, convex, without epipleuron. Apex narrowly rounded. Postclaval margin weakly rounded on distal half and slightly notched at apex of clavus. Clavus closed, reaching about $\frac{3}{5}$ of tegmen. Venation: ScP+R rather short, forking into subparallel ScP+RA and RP; RP forking at about midlength of tegmen; MP first fork at about half of tegmen length; CuA straight, unforked and reaching hind margin; additional vein in cubital cell, parallel to postclaval margin, originating from level of apex of clavus and not reaching apical margin; Pcu fused with A1 at $\frac{3}{5}$ of clavus length; Pcu+A1 fused with CuP at apex of clavus.

HIND WINGS (Fig. 4E). Broader than tegmina and deeply bilobed, strongly notched at CuP; costal margin sinuate; CuP-Pcu-A1 lobe much wider than Sc-R-MP-CuA lobe, and slightly longer than latter; both lobes rounded apically; postclaval margin broadly rounded; anal lobe reduced and narrow, with weak A2 vein. Venation: main veins present; ScP+R, MP and CuA running more or less parallel in basal portion, with ScP+R diverging beyond basal $\frac{1}{3}$, with numerous cross-veins; Pcu strongly curved around basal third of wing towards CuP and reaching the latter; A1 curved, more or less parallel to postclaval margin; CuP-Pcu-A1 lobe with numerous cross-veins.

LEGS (Fig. 3). Elongate and slender. Tibiae slightly longer than corresponding femora. Metatibiae with 2 lateral spines in distal half and 7 apical spines. Tarsi elongate; first metatarsomere elongate and slender, with a strong spine at each side and a row of 5 smaller spines in between ventrally along posterior margin; second metatarsomere short with one spine at each side. Metatibiotarsal formula: (2) 7 / 8 / 2.

MALE TERMINALIA. Pygofer higher than long in lateral view, with anterior margin weakly concave and posterior margin broadly rounded. Gonostyli rather elongate, projecting posteriorly, with capitulum strongly developed dorsad, with lateral laminate projection and with rather long neck with outer margin strongly concave in posterior view. Anal tube dorsoventrally flattened, rather wide in dorsal view. Aedeagus curved dorsad (in lateral view), with symmetrical pair of elongate lateroventral processes directed caudad. Connective elongate.

Cyclopissus corticalis gen. et sp. nov.

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Figs 1, 2D, 3–6

Diagnosis

Cyclopissus corticalis gen. et sp. nov. is the only species in the genus *Cyclopissus* gen. nov. The markings of the frons, like the white line along the lower margin of the oculiform black shiny marking, and characters of the male terminalia, are probably relevant diagnostic characters to recognize the species, e.g., the subhexagonal anal tube in dorsal view and the size and shape (curvature) of the lateroventral processes of the aedeagus.

Differential diagnosis

The most similar species belong to the genus *Tetricodes* which can be separated by the characters given above for the genus *Cyclopissus* gen. nov.

Etymology

The species epithet ‘*corticalis*’ is a Latin adjective meaning ‘resembling or consisting of bark or rind’. It refers to the excellent camouflage of this species, which lives on the bark of trees covered in moss and lichen.

Type material

Holotype

VIETNAM • ♂ (dissected – Figs 3–5); Thừa Thiên-Huế Province, Bach Ma National Park, summit; 16°11'18" N, 107°50'56" E; 11–21 May 2023; 1300–1400 m a.s.l.; J. Constant and L. Semeraro leg.; VNMN.

Paratypes

VIETNAM – **Thừa Thiên-Huế Province** • 2 ♀♀; same data as for holotype; VNMN • 2 ♂♂, 2 ♀♀; same data as for holotype; I.G.: 34.640; RBINS • 1 ♀; Bach Ma National Park, stairs going up to Hai Vong Dai; 16°11'53.77" N, 107°51'26.92" E; 16 Sep. 2024; 1272 m a.s.l.; [by] net; Hoai leg.; VNMN.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 3): 6.2 mm (6.1–6.3), ♀ (n = 4): 7.8 mm (6.6–7.0); LT/BB = 1.84; LTg/BTg = 2.33; LW/BW = 1.51; BV/LV = 2.11; LF/BF = 1.01.

HEAD (Fig. 4A–D). Head variegated brown, slightly narrower than thorax. Vertex slightly more than two times as wide as long in midline, medially grooved with margins weakly carinate; sides subparallel; anterior and posterior margins subparallel and curved. Posterior face of head largely blackish brown. Frons as wide at maximum width slightly above clypeus, as long in midline, with large oculiform black, shiny marking in dorsal portion with pale yellowish spot in dorsomedian portion, black marking finely circled in pale brown, turning to slightly wider pale yellowish in ventral portion; median carina in ventral portion, disappearing at midheight of black marking; pale yellowish tubercles along lateral margins under midheight of eye; laterodorsal angles black. Clypeus slightly paler basally, flat in middle portion, moderately elongate, subtriangular with fronto-clypeal suture rounded; anteclypeus with median blunt carina. Labium yellow-brown, elongate and narrow, reaching metacoxae, with apical segment elongate, nearly as long as penultimate. Eyes reniform (not emarginate), strongly projecting laterally; ocelli absent. Antennae dark brown, rather short with scape ring-shaped and pedicel cylindrical, slightly longer than broad.

THORAX (Fig. 4A–D). Pronotum variegated brown, with more or less well marked median yellowish line on obsolete carina; impressed point on each side of median carina; anterior margin bordered posteriorly with several yellowish blunt tubercles and carinate in middle portion, strongly sinuate and strongly, roundly protruding anteriorly between eyes; posterior margin nearly straight, slightly carinate in middle portion; pale yellowish blunt tubercles on disc and sides; behind eyes, large blackish marking containing pale yellowish mark, with black area continued on inner half of paranotal lobes; lateral half of paranotal lobes yellowish brown with yellowish tubercles along posterior margin, with posteroventral angle of lobes rounded. Mesonotum yellowish with yellowish, obsolete median carina in middle of rather wide dark brown median line; weak peridiscal carinae bordered with dark brown fine line; lateral angles darker; apex of scutellum pale yellowish. Tegulae yellowish.

TEGMINA (Fig. 3A–C). Tegmina variegated brown with main veins raised and yellowish, and dense network of pale, nearly whitish, cross-veinlets; subcoriaceous, elongate, about 2.3 times as long as broad, convex with sides broadly rounded (middle portion nearly straight to weakly incurved in dorsal view); epipleuron not developed. Apex narrowly rounded. Postclaval margin weakly rounded on distal half and slightly notched at apex of clavus. Clavus closed, reaching about $\frac{3}{5}$ of tegmen. Venation: ScP+R rather short, forking into subparallel ScP+RA and RP; RP forking at about midlength of tegmen; MP first fork at about half of tegmen length; CuA straight, unforked and reaching hind margin; Pcu fused with A1 at $\frac{3}{5}$ of clavus length; Pcu+A1 fused with CuP at apex of clavus.

HIND WINGS (Fig. 4E). Dark brown with contrasting yellow-brown markings, one basal along vein Pcu and one central, larger, including portion of Pcu. Hing wings wider than tegmina and deeply bilobed, strongly notched at CuP; costal margin sinuate; CuP-Pcu-A1 lobe about 1.7 times as wide as Sc-R-MP-CuA lobe, and slightly longer than latter; both lobes rounded apically; postclaval margin broadly rounded; A2 lobe reduced and narrow. Venation: main veins distinct, numerous cross-veins; ScP+R, MP and CuA running more or less parallel in basal portion, with ScP+R diverging beyond basal $\frac{1}{3}$; Pcu

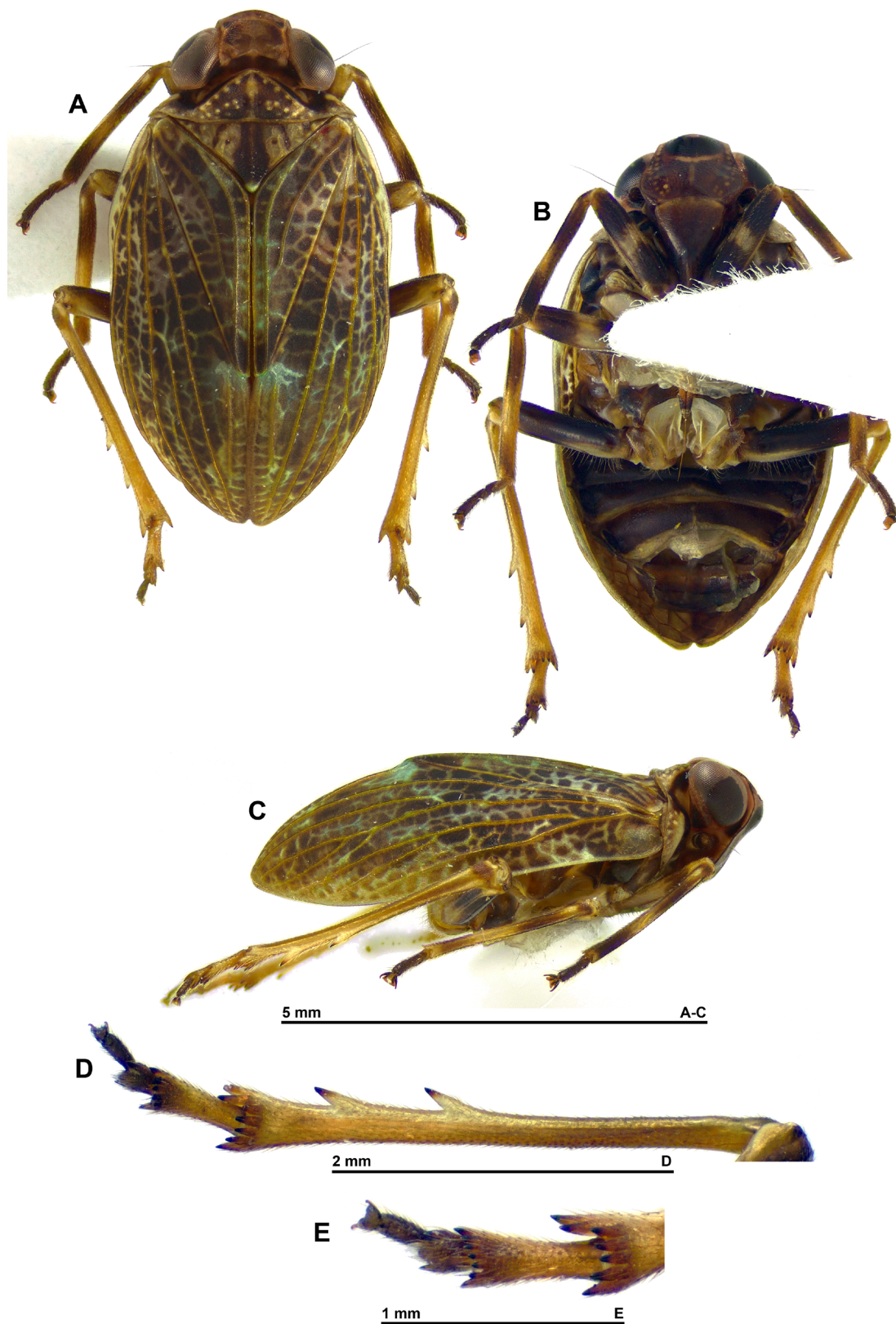


Fig. 3. *Cyclopissus corticalis* gen. et sp. nov., dissected holotype, ♂ (VNMN). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Right hind leg, ventral view. E. Metatarsus and apex of metatibia, ventral view.

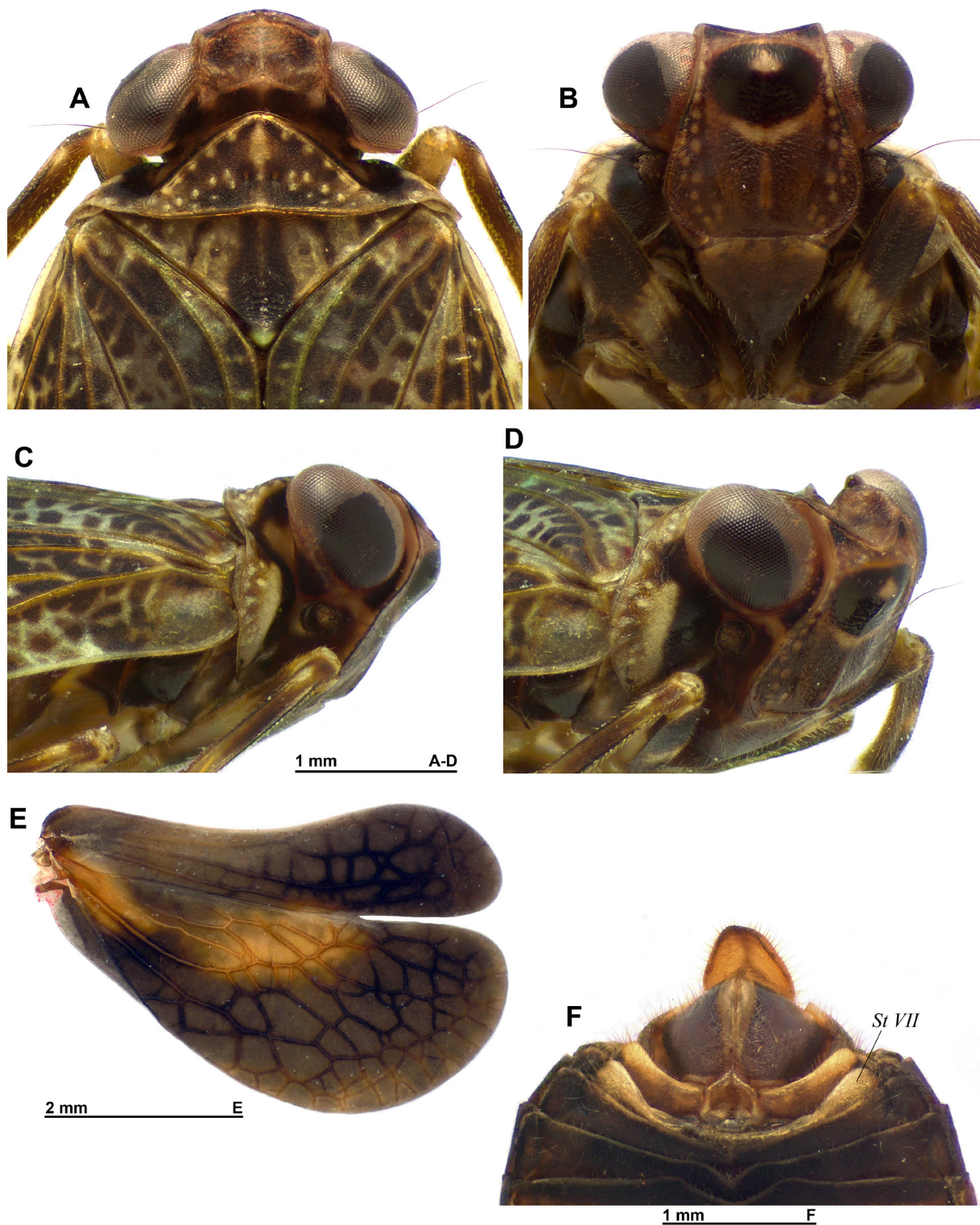


Fig. 4. *Cyclopissus corticalis* gen. et sp. nov. A–E. Holotype ♂ (VNMN). A. Head and thorax, dorsal view. B. Frons, perpendicular view. C. Head and thorax, lateral view. D. Head and thorax, anterolateral view. E. Right hind wing. F. Paratype ♀ (VNMN), terminalia, ventral view. Abbreviation: see Material and methods.

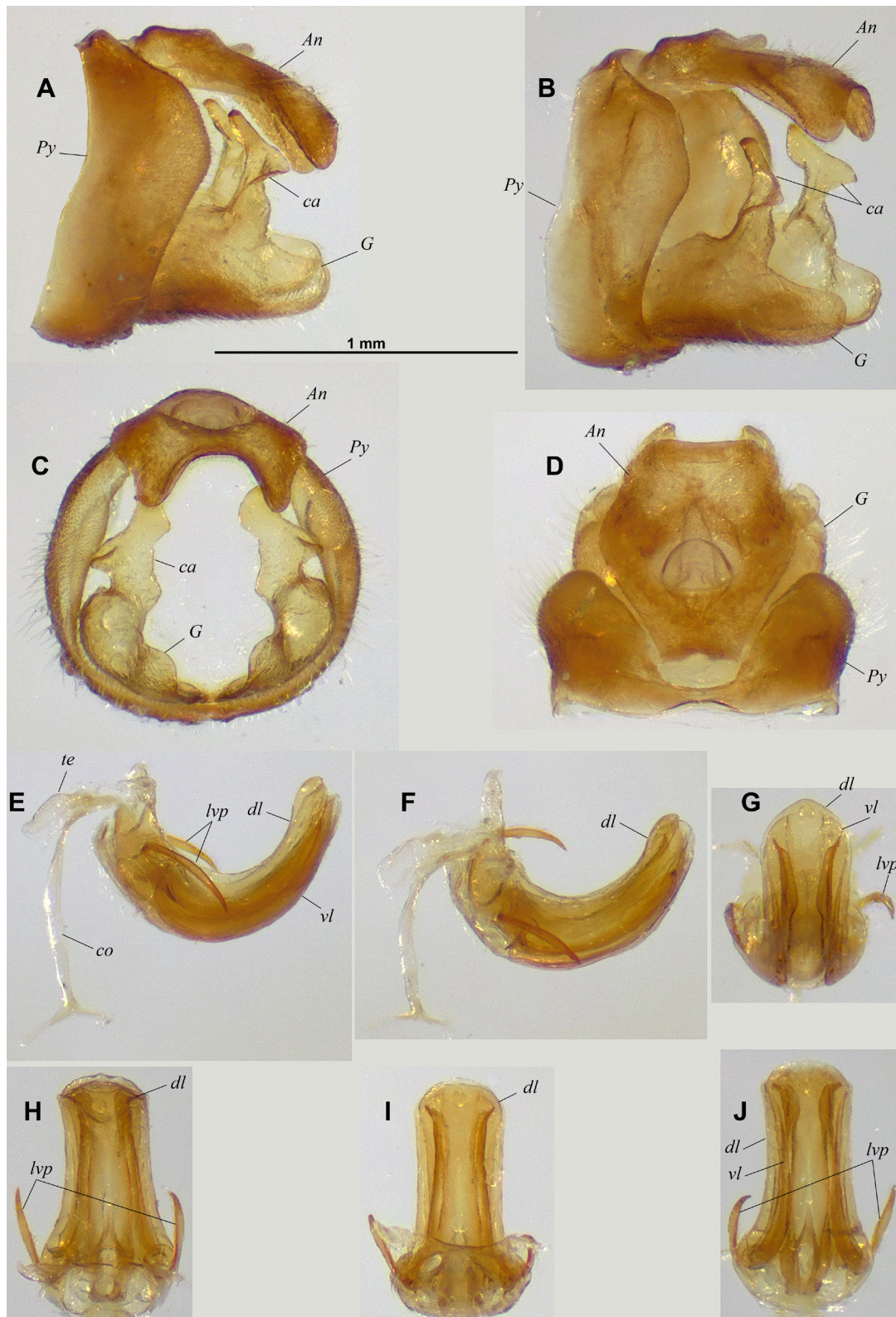


Fig. 5. *Cyclopissus corticalis* gen. et sp. nov., holotype, ♂ (VNMN). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Caudal view. **D.** Dorsal view. **E–J.** Aedeagus. **E.** Left lateral view. **F.** Left laterodorsal view. **G.** Posteroventral view. **H.** Dorsal view. **I.** Anterodorsal view. **J.** Ventral view. Abbreviations: see Material and methods.

strongly curved around basal third of wing towards CuP, and reaching the latter; A1 curved, more or less parallel to postclaval margin; CuP-Pcu-A1 lobe with numerous cross-veins. Vein A2 weak.

LEGS (Fig. 3). Pro- and mesocoxae pale yellowish with dark marking along anterior margin. Pro- and mesofemora elongate, relatively slender, shorter than corresponding tibiae, brown with apex paler and



Fig. 6. *Cyclopissus corticalis* gen. et sp. nov., live specimens in Bach Ma National Park, summit. A. 13 May 2023. B–C. 14 May 2023.

median pale yellowish ring, brown colour darker on ventral face. Pro- and mesotibiae more slender than corresponding femora, pale yellowish with subbasal and subapical brown rings leaving more or less wide pale ring in middle. Metafemora dark brown with posterior side pale yellowish in basal portion. Metatibiae yellowish with 2 lateral spines in distal half and 7 apical spines, apex of all spines black. Tarsi elongate; first metatarsomere yellowish, elongate and slender, with a strong spine at each side and a row of 5 smaller spines in between ventrally along posterior margin, apex of all spines black; second metatarsomere brown, short with one spine at each side. Metatibiotarsal formula: (2) 7 / 8 / 2.

MALE TERMINALIA. Pygofer (*Py* – Fig. 5A–D) higher than long in lateral view, with anterior margin weakly concave and posterior margin broadly rounded in upper half; subcircular in caudal view; posterior margin deeply emarginate in dorsal view. Gonostyli (*G* – Fig. 5A–C) rather elongate, projecting posteriorly and with rounded posterior margin in lateral view, with capitulum (*ca*) strongly developed dorsad, with lateral laminate upcurving projection and with rather long neck with outer margin strongly concave and inner margin sinuate, in caudal view, and apical portion anteroposteriorly flattened, with apical hook and inner margin angularly rounded. Anal tube (*An* – Fig. 5A–D) dorsoventrally flattened, rather wide and subhexagonal in dorsal view and with posterolateral angles expanded lateroventrally, leaving middle portion of posterior margin strongly excavate in caudal view. Aedeagus curved dorsad (in lateral view), with symmetrical pair of elongate, apically pointed lateroventral processes (*hyp*) directed caudad; dorsal lobe (*dl*) angularly rounded apically and surpassing apically rounded ventral lobe (*vl*) in caudal view. Connective (*co*) elongate, tectiductus (*te*) moderately developed.

FEMALE TERMINALIA. Hind margin of sternum VII (*St VII* – Fig. 4F) concave, moderately inflated towards lateral portion.

Biology

Cyclopius corticalis gen. et sp. nov. was collected in May and September, in montane evergreen tropical forest, exclusively at about 1300–1400 m a.s.l. near the summit (Fig. 1D). The species lives on tree trunks densely covered in lichens and mosses, on which it is very cryptic (Fig. 6). When disturbed, they tend to walk away and hide on the opposite side of the trunk or branch, and jump away as a last solution.

Distribution

Vietnam: Thừa Thiên-Huế Province, summit of Bach Ma National Park (Fig. 1).

Genus *Flavina* Stål, 1861

Flavina Stål, 1861: 209. Type species: *Flavina granulata* Stål, 1861, by original designation.

Nilalohita Distant, 1906: 358. Type species: *Nilalohita curculioides* Distant, by original designation.

Synonymised by Gnezdilov & Wilson (2007: 106).

Dolia Kirkaldy, 1907: 95. Type species: *Hiracia walkeri* Signoret, 1861, by original designation.

Synonymised by Gnezdilov (2009: 84).

Diagnosis

The genus is characterized and separated from all other Parahiraciini genera by the following combination of characters:

- (1) head with vertex apparently elongate, about 1.1 times as wide as long in midline, not projecting anteriorly and with hind margin angularly excavate;
- (2) frons more or less flattened, with a median carina, with a row of tubercles along lateral margins and with upper margin concave;
- (3) genae without strong carina under the antennae;

- (4) body oval in dorsal aspect, less than twice as long as maximum width;
- (5) metatibiae with two to five lateral and eight apical spines;
- (6) tegmina with vein CuA curved at apex of clavus, unbranched and reaching the hind margin of tegmen;
- (7) anal tube of male dorsoventrally flattened, rather wide;
- (8) gonostyli with capitulum rather massive and projecting dorsad, with a moderate neck;
- (9) aedeagus evenly and moderately curved in lateral view, with pair of elongate, usually slender, symmetrical, lateroventral processes.

Species included (distribution)

Flavina acuta Ran & Liang, 2006 (Laos and Vietnam – Ran & Liang 2006)

Flavina bachmana sp. nov.

Flavina curculioides (Distant, 1906) (Myanmar – Distant 1906)

Flavina granulata Stål, 1861 (China (Guizhou) and India (Uttaranchal) – Stål 1861; Chen *et al.* 2014)

Flavina hainana (Wang & Wang, 1999) (China (Hainan and Yunnan) – Wang & Wang 1999; Zhang *et al.* 2010; Chen *et al.* 2014; Sun *et al.* 2015)

Flavina lami sp. nov.

Flavina lineata (Walker, 1857) (Borneo and Singapore – Walker 1857; Distant 1909)

Flavina nigrifasciata Che & Wang, 2010 (China (Yunnan) – Zhang *et al.* 2010)

Flavina nigrifrons Zhang & Che, 2010 (China (Guangxi) – Zhang *et al.* 2010)

Flavina quadrispina Ran & Liang, 2006 (Thailand – Ran & Liang 2006)

Flavina quangi sp. nov.

Flavina striata Distant, 1906 (Myanmar – Distant 1906)

Flavina walkeri (Signoret, 1861) (India – Signoret 1861)

Flavina yunnanensis Chen, Zhang & Chang, 2014 (China (Yunnan) – Chen *et al.* 2014)

Note

Only one species of *Flavina* was recorded from Vietnam, *F. acuta*, described by Ran & Liang (2006) based on a male holotype from Laos, Vientiane Province, Ban Van Eue and two male paratypes from Vietnam, Lam Dong Province: Dalat and Mount Langbian, respectively. It is interesting to note that the locality of the holotype is separated by more than 1000 km from those of the paratypes. Another record of the genus *Flavina*, based on a single female from Lam Dong Province, Bidoup massif, was provided by Gnezdilov *et al.* (2014a).

Flavina bachmana sp. nov.

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Figs 2, 7–11

Diagnosis

Flavina bachmana sp. nov. can be recognized by:

- (1) the narrow dorsal margin of the frons, equal to 0.27 of the length of the frons in midline;
- (2) the vertex with median carina distinct only in basal portion;
- (3) the pronotum with median carina very weak or indistinct;
- (4) the mesonotum with median carina very weak or indistinct but with supplementary carinae between midline and peridiscal carina and in lateral fields, respectively;
- (5) the pygofer subquadrate in lateral view, slightly tapering from ventral $\frac{1}{3}$ towards dorsal margin;
- (6) the anal tube with apical margin rounded and lateral lobes moderately developed, rounded;
- (7) the capitulum of the gonostylus massive, wide, subtriangular (higher than wide), dorsally hooked cephalodorsad, and with wide neck;
- (8) the lateroventral processes of the aedeagus short, slender, more or less straight and pointing cephalad.

Differential diagnosis

The closest species are *F. acuta* and *F. quang* sp. nov. which differ by much longer, curved lateroventral processes of the aedeagus (Ran & Liang 2006: figs 7–8; Fig. 17E, K) as opposed to short and straight in *F. bachmana* sp. nov. (Fig. 9E, K). *Flavina acuta* also differs by a truncate apical margin of the anal tube in dorsal view (Ran & Liang 2006: fig. 5), which is rounded in *F. bachmana* (Fig. 9D), and a much more elongate and narrow capitulum of the gonostylus without strong apical hook (Ran & Liang 2006: figs 4, 6), which is wider, shorter and apically hooked in *F. bachmana* (Fig. 9A–B). *Flavina quang* also differs by the obsolete carinae of the mesonotum (Fig. 16A) which are well marked in *F. bachmana* (Fig. 8A), the anal tube with truncate apex in dorsal view (Fig. 17D) which is rounded in *F. bachmana* (Fig. 9D), and with lateral lobes strongly developed, angularly rounded and projecting posteroventrad (Fig. 17 A–B) instead of rounded in *F. bachmana* (Fig. 9A–B).

Etymology

The species epithet refers to Bach Ma National Park, where the species was first discovered.

Type material

Holotype

VIETNAM • ♂ (dissected – Figs 7–9); Thừa Thiên-Huế Province, Bach Ma National Park; 16°11'44" N, 107°50'44" E; 22 May 2023; 1200–1300 m a.s.l.; J. Constant and L. Semeraro leg.; roadside; VNMN.

Paratypes

VIETNAM – **Thừa Thiên-Huế Province** • 1 ♂; same data as for holotype; I.G.: 34.640; RBINS • 3 ♂♂, 4 ♀♀; Bach Ma National Park; summit; 16°11'18" N, 107°50'56" E; 11–21 May 2023; 1300–1400 m a.s.l.; J. Constant and L. Semeraro leg.; VNMN • 3 ♂♂, 4 ♀♀; same data as for preceding; I.G.: 34.640; RBINS • 1 ♀; Bach Ma National Park, Pheasant trail; 16°13'38" N, 107°51'20" E; 10–20 May 2023; 500–600 m a.s.l.; J. Constant and L. Semeraro leg.; I.G.: 34.640; RBINS • 2 ♀♀; Bach Ma National Park, summit; 16°12' N, 107°52' E; 15–16 Jul. 2011; [1300–1400 m a.s.l.]; J. Constant and J. Bresseel leg.; day [time] collecting; I.G.: 31.933; RBINS • 1 ♂; Bach Ma National Park; 16°12' N, 107°52' E; 10–16 Apr. 2017; J. Constant and J. Bresseel leg.; I.G.: 33.447; RBINS • 1 ♂; Bach Ma National Park; 600 m a.s.l.; 8 May 2003; V.T. Hoang leg.; VNMN • 1 ♂; Bach Ma National Park, Rhodo[dendron] trail; 27 May 2023; 1158 m a.s.l.; N.T.T. Hoai leg.; VNMN. – **Quang Tri Province** • 1 ♂; Da Krong Nature Reserve; [16°36'32" N, 106°52'50" E]; 2 Apr. 2004; 200–300 m a.s.l.; T.D. Tran leg.; VNMN.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 5): 8.6 mm (8.2–8.8), ♀ (n = 5): 9.2 mm (9.0–9.6); LT/BB = 1.91; LTg/BTg = 2.58; LW/BW = 1.39; BV/LV = 1.10; LF/BF = 1.62.

HEAD (Fig. 8A–D). Narrower than thorax and rather elongate, with about half of vertex length surpassing eyes. Vertex yellowish with black markings apically, and laterally in distal portion, strongly concave (longitudinally grooved), about 0.9 times as long in midline as broad basally, with sides evenly converging towards rounded apex; rather weak median carina, sometimes nearly obsolete, not reaching apex, yellowish; all margins carinate, lateral ones strongly elevated; posterior margin angularly concave. Frons blackish brown, darker along sides and dorsal margin, with minute yellowish points in central portion and often rather large yellowish marking in middle; series of small yellowish tubercles along lateral margins; median carina well marked, extending from dorsal margin to slightly before clypeal suture; dorsal margin concave and narrow, 0.27 times as wide as length of frons in midline. Posterior side of head yellowish. Genae yellowish with black-brown marking between eye and anterodorsal angle, between anteroventral angle of eye and lateral margin of frons, and above clypeus. Clypeus coloured as

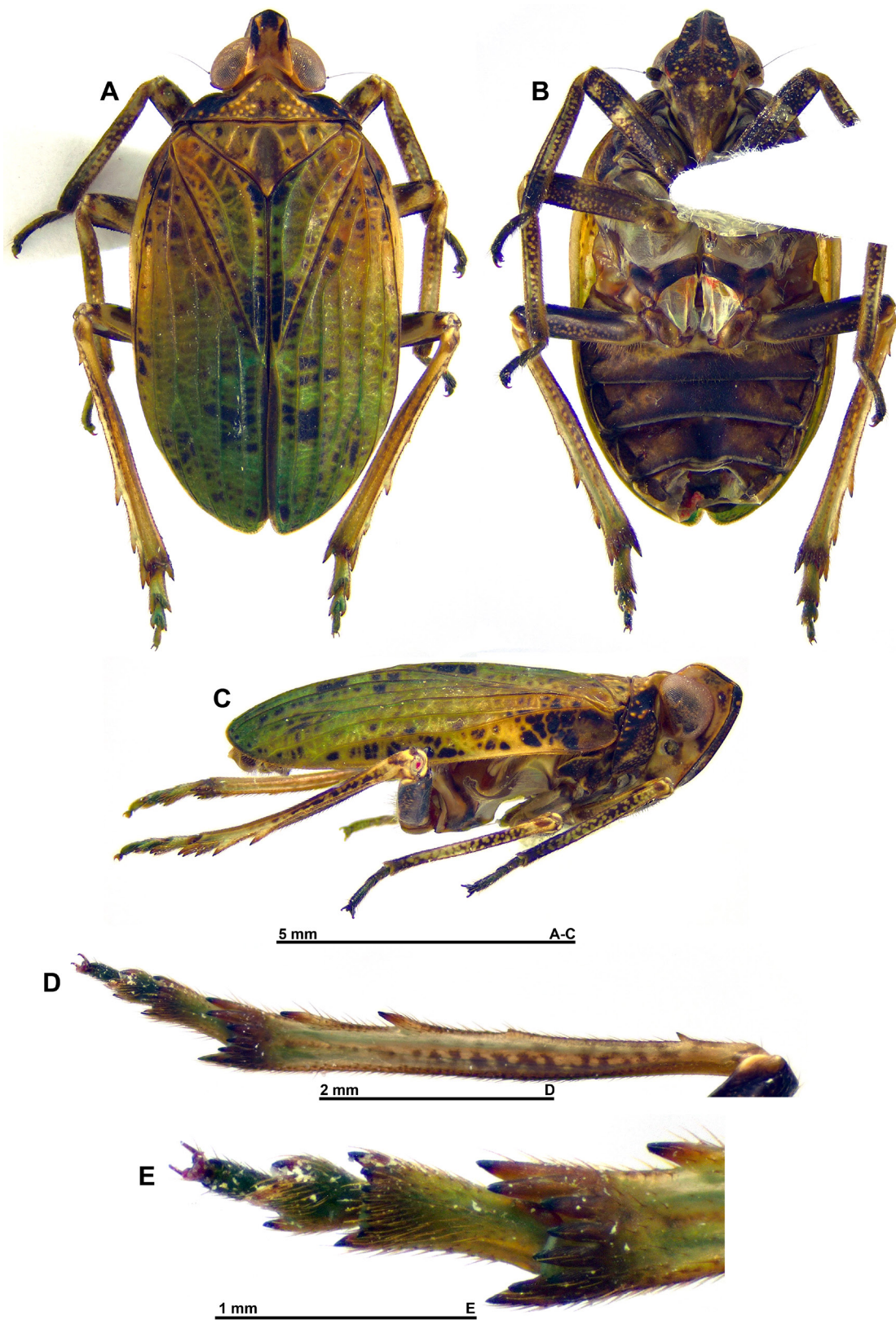


Fig. 7. *Flavina bachmana* sp. nov., dissected holotype, ♂ (VNMN). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Right hind leg, ventral view. **E.** Metatarsus and apex of metatibia, ventral view.

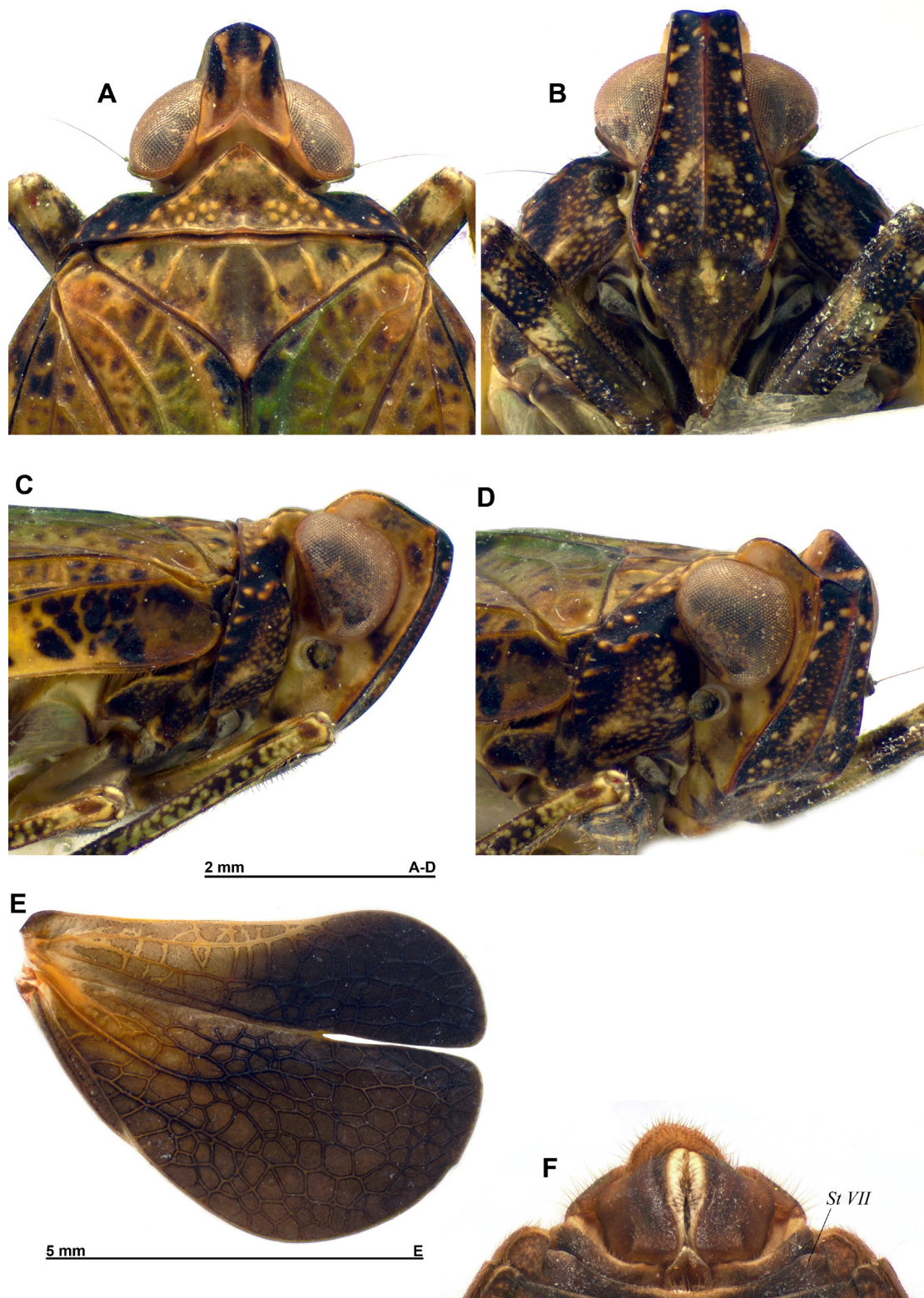


Fig. 8. *Flavina bachmana* sp. nov. A–E. Holotype ♂ (VNMN). A. Head and thorax, dorsal view. B. Frons, perpendicular view. C. Head and thorax, lateral view. D. Head and thorax, anterolateral view. E. Right hind wing. F. Paratype ♀ (VNMN), terminalia, ventral view. Abbreviation: see Material and methods.

frons, often with mediobasal yellowish spot, flat in middle portion, moderately elongate, subtriangular with fronto-clypeal suture moderately rounded; anteclypeus mostly yellowish, brown apically, with median blunt carina. Labium yellowish, elongate and narrow, nearly reaching metacoxae, with apical segment elongate, nearly as long as penultimate. Eyes reniform (not emarginate) protruding laterally; ocelli absent. Antennae rather short with scape yellowish, ring-shaped, and pedicel dark brown, barrel-shaped, slightly longer than broad.

THORAX (Fig. 8A–D). Pronotum with disc (delimited by peridiscal carina) yellowish, with central depression often washed with brownish, lateral fields blackish brown, paranotal lobes coloured like frons, darker along posterior margin, yellowish tubercles on disc and along posterior margin of lateral fields and paranotal lobes; 0.63 times as long as mesonotum in midline; anterior margin strongly protruding anteriorly between eyes, with carinae directed obliquely posteriorly, not reaching hind margin of pronotum; posterior margin nearly straight, slightly elevated; median carina obsolete with impressed point on each side; paranotal lobes (lateral view) broad with hind margin rounded, somewhat angularly rounded posteroventrally. Mesonotum variegated yellowish, often with two black points on each side; subtriangular with nearly complete transverse anterior carina and with obsolete median carina but with supplementary carinae between midline and peridiscal carina and in lateral fields, respectively; disc smooth, slightly depressed in midline. Tegulae dark brown.

TEGMINA (Figs 7A–C, 10). Variegated yellowish brown, sometimes washed with green, with apex of clavus blackish brown and more or less extensive, scattered, irregular blackish brown markings; sometimes with posteromedian whitish marking; tegmina subcoriaceous with longitudinal veins moderately elevated and with dense reticulum of paler veinlets; shape elongate and convex with sides broadly rounded, subparallel in middle portion, about 2.6 times as long as wide; rather narrowly rounded apically. Postclaval margin straight, slightly notched at apex of clavus. Clavus closed, reaching about $\frac{3}{5}$ of tegmen. Venation (Fig. 7A, C): ScP+R moderately developed, forking into subparallel ScP+RA and RP; MP forking rather close to base into subparallel MP₁₊₂ and MP₃₊₄; MP₁ and MP₂ separated at about $\frac{3}{4}$ of tegmen length, MP₃ and MP₄ separated at about basal $\frac{1}{3}$ of tegmen, MP₃ not reaching apex of tegmen, only running to about MP₁-MP₂ fork; CuA unforked, parallel to claval joint and curved at apex of clavus, then parallel to postclaval margin; Pcu fused with A1 at $\frac{2}{3}$ of clavus length; Pcu+A1 fused with CuP slightly before apex of clavus.

HIND WINGS (Fig. 8E). Dark brown with paler area basally and along costal margin, following vein ScP+R; veins mostly coloured as background; wing broader than tegmen and deeply bilobed at CuP; costal margin rather weakly sinuate; CuP-Pcu-A1 lobe about 1.5 times as wide as ScP-R-MP-CuA lobe, the two lobes almost the same length; both lobes somewhat angularly rounded apically; postclaval margin broadly rounded; A2 lobe brown, reduced and narrow. Venation: main veins present; ScP+R merging with costal margin at nodal line, MP and CuA running more or less parallel, with numerous cross-veins; Pcu strongly curved around basal half of wing towards CuP; A1 curved, more or less parallel to postclaval margin; CuP-Pcu-A1 lobe with dense network of cross-veins; vein A2 distinct.

LEGS (Fig. 7A–E). Coxae brown; trochanters variegated yellowish and brown. Pro- and mesofemora brown with median yellowish ring and more or less dense yellowish pitting in brown zones; ventral face darker than dorsal; elongate, rather slender and slightly flattened dorsoventrally. Pro- and mesotibiae yellowish with some brown pitting forming more or less distinct subbasal ring; apex brown; tibiae weakly flattened dorsoventrally, narrower and longer than corresponding femora. Pro- and mesotarsi elongate and brown. Metafemora dark brown with elongate yellowish marking along posterodorsal portion ending in subapical dorsal band. Metatibiae variegated yellowish with some brown pitting, with one lateral spine near base (sometimes weak to obsolete), 2–3 lateral spines and 8 apical spines, all spines brown, distally black. First metatarsomere elongate and slender, with a strong spine at each side

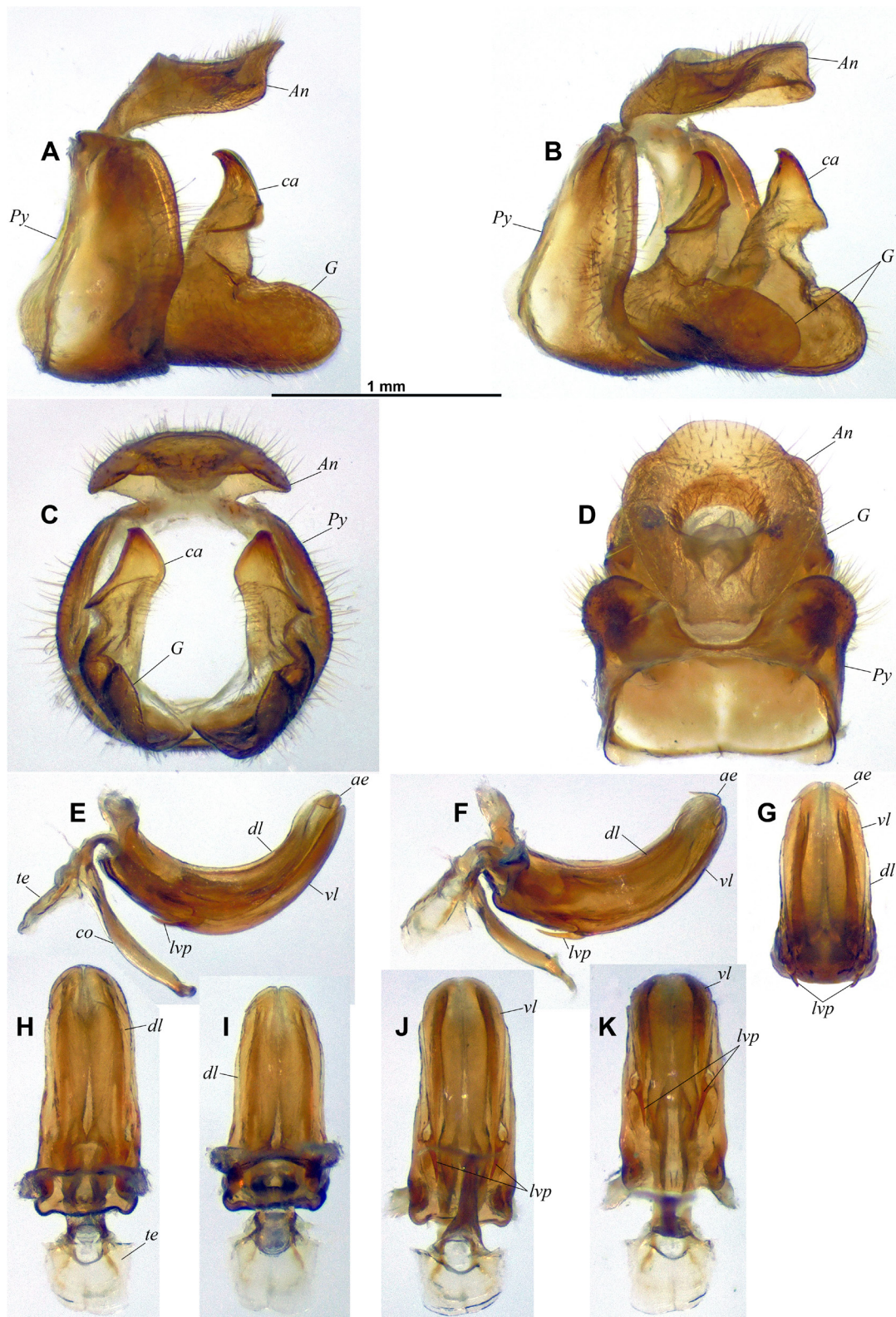


Fig. 9. *Flavina bachmana* sp. nov., holotype, ♂ (VNMN). A–D. Pygofer, anal tube and gonostyli. A. Left lateral view. B. Posterolateral view. C. Caudal view. D. Dorsal view. E–K. Aedeagus. E. Left lateral view. F. Left laterodorsal view. G. Posteroventral view. H. Dorsal view. I. Anterodorsal view. J. Ventral view. K. Anteroventral view. Abbreviations: see Material and methods.

and a row of 6 smaller spines in between ventrally along posterior margin; second metatarsomere short with one spine at each side, all spines black-brown apically. Metatibiotarsal formula: (3–4) 8 / 8 / 2.

ABDOMEN (Fig. 7B). Brown, each sternite with large, darker, crescent-shaped marking along hind margin.

MALE TERMINALIA. Pygofer (*Py* – Fig. 9A–D) about 2.0 times as high as long (at midheight) in lateral view, with anterior margin weakly sinuate and posterior margin more or less straight, weakly oblique along dorsal $\frac{2}{3}$ then abruptly rounded at posterodorsal angle, slightly excavate in ventral $\frac{1}{3}$; posterior margin dorsally with deep, U-shaped excavation. Gonostyli (*G* – Fig. 9A–C) (in lateral view) longer than high (without dorsal capitulum), projecting posteriorly in distinct elongate lobe rounded apically and with ventral margin more or less straight; capitulum (*ca* – Fig. 9A–C) with rather long, wide neck, directed dorsad, with distal portion moderately elongate and twisted, with apical hook directed dorsocephalad and with basal lamina projection directed lateroventrad in caudal view. Aedeagus (Fig. 9E–J) symmetrical, evenly curved dorsad (in lateral view); pair of pointed, short, slender, straight lateroventral processes (*lvp*) directed cephalad; ventral lobe of periandrium (*vl*) rather wide, spatulate, shorter than aedeagus (*ae*) and dorsal lobe (*dl*); aedeagus bilobed apically, each lobe with apical triangular process pointing laterocephalad. Connective (*co*) well developed, elongate, weakly curved, with tectiductus (*te*) well developed, widely open. Anal tube (*An* – Fig. 9A–D) dorsoventrally flattened, in dorsal view widening from base towards apex, forming narrow, rounded lateral lobe and with large middle portion of apical margin rounded; lateral lobes distinct in lateral view, more or less rounded and moderately developed; anal opening before basal $\frac{1}{2}$.

FEMALE TERMINALIA. Hind margin of sternum VII (*St VII* – Fig. 8F) concave, moderately inflated in middle portion.

Biology

Flavina bachmana sp. nov. was collected between April and July in montane evergreen tropical forest as well as in lowland evergreen forest in Bach Ma, at altitudes between 500 and 1400 m a.s.l. (Fig. 2A–D); in Da Krong the species was found at a lower altitude, 200–300 m a.s.l. The species lives on tree trunks densely covered in lichens and mosses, on which it is very cryptic, but some specimens were also found sitting on leaves of lower plants and bushes, and collected by sweeping (Fig. 10). When disturbed, they tend to walk away and hide on the opposite side of the trunk or branch, and jump away as a last solution.

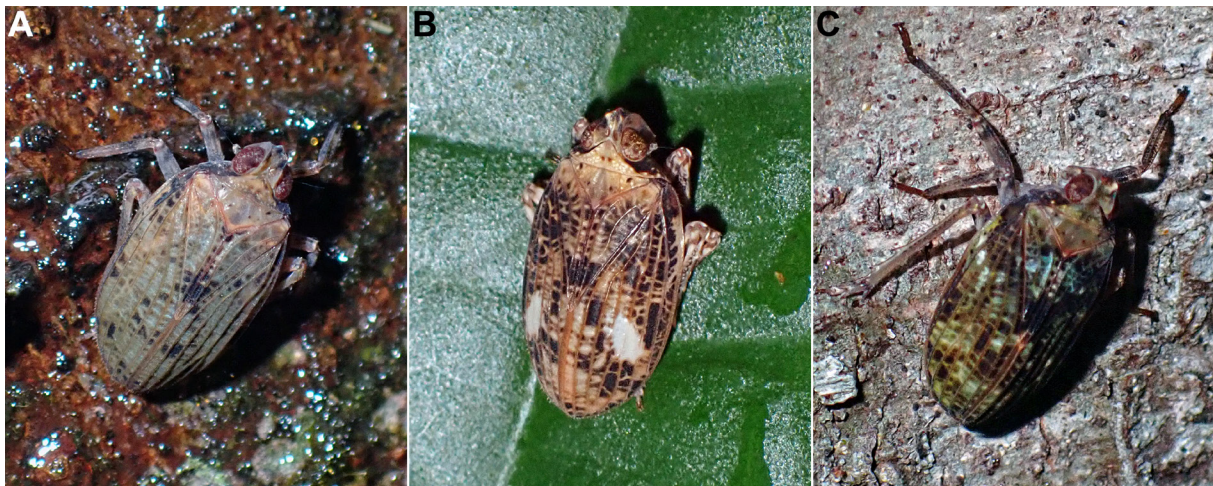


Fig. 10. *Flavina bachmana* sp. nov., live specimens in Bach Ma National Park. A. 14 May 2023, summit. B. 12 May 2023, Pheasant trail. C. 13 May 2023, summit.



Fig. 11. *Flavina bachmana* sp. nov., distribution map.

Distribution

Vietnam: Thừa Thiên-Huế Province, Bach Ma National Park, and Quang Tri Province, Da Krong Nature Reserve (Fig. 11).

Flavina lami sp. nov.

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Figs 1, 2D, 12–14

Diagnosis

Flavina lami sp. nov. can be recognized by:

- (1) the moderately narrow dorsal margin of the frons, equal to 0.35 of the length of the frons in midline;

- (2) the vertex without median carina;
- (3) the pronotum with obsolete median carina;
- (4) the mesonotum without median carina and with peridiscal carinae very weakly marked;
- (5) the pygofer subquadrate in lateral view, with posterior margin broadly rounded and maximum length around midheight;
- (6) the anal tube with apical margin strongly bisinuate, with middle portion roundly protruding and with lateral lobes strongly developed, angularly pointing posteroventrad;
- (7) the capitulum of the gonostylus massive, wide, falcate and short (about as high as wide), dorsally hooked cephalodorsad, and with wide neck;
- (8) the lateroventral processes of the aedeagus elongate, rather wide in basal portion and directed mesocephalad (weakly sinuate), then tapering, curved laterocephalad and pointed apically.

Differential diagnosis

The identification key to the species of *Flavina* proposed by Zhang *et al.* (2010) leads to *F. walkeri*, described from “India”. However, from the description and illustrations provided by Signoret (1861), *F. walkeri* differs by the vertex more than 1.5 times as wide as long (about 1.2 times as long as wide in *F. lami* sp. nov.), the pronotum densely tuberculate on disc and along anterior margin (no tubercles on pronotum in *F. lami*), the yellowish abdomen (dark brown in *F. lami*) and the seven lateral spines of the metatibiae (3–4 in *F. lami*). The species also shares a number of characters with *F. quangi* sp. nov., also found in Bach Ma National park, but can be separated from the latter by a smaller size (LT = 6.6 mm; 8.0 minimum in *F. quangi*), the broadly rounded hind margin of the pygofer in lateral view (weakly concave in dorsal $\frac{2}{3}$, then strongly emarginate in ventral $\frac{1}{3}$ in *F. quangi*) and the round apical margin of the anal tube of the male in dorsal view (emarginate in *F. quangi*).

Etymology

The species epithet is a patronym dedicated to Lâm Bá Vũ Nguyễn, one of the rangers who helped us during the fieldwork in Bach Ma National Park.

Type material

Holotype

VIETNAM • ♂; [Thừa Thiên-Huế Province], Bach Ma National Park, summit; 16°12' N, 107°52' E; 15–16 Jul. 2011; [1300–1400 m a.s.l.]; J. Constant and J. Bresseel leg.; day [time] collecting; I.G.: 31.933; RBINS.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 6.6 mm; LT/BB = 1.85; LTg/BTg = 2.51; LW/BW = 1.50; BV/LV = 1.17; LF/BF = 1.42.

HEAD (Fig. 13A–D). Narrower than thorax and moderately elongate, with less than half of vertex length surpassing eyes. Vertex variegated brown with median line and basal portion of lateral carinae paler, strongly concave (longitudinally grooved), about 0.85 times as long in midline as broad basally, with sides weakly, evenly converging towards somewhat angular apex; median carina absent; all margins carinate, lateral ones strongly elevated; posterior margin angularly concave. Frons variegated brown, darker along dorsal margin; series of small yellowish tubercles along lateral margins; median carina well marked, extending from dorsal margin to slightly before clypeal suture; dorsal margin concave and moderately narrow, 0.35 times as wide as length of frons in midline. Posterior side of head yellowish. Genae yellowish with black-brown marking at anterodorsal angle and anterior to base of antennae. Clypeus coloured as frons, flat in middle portion, moderately elongate, subtriangular with fronto-clypeal suture rounded; anteclypeus yellowish, brown apically, with median blunt carina. Labium yellowish, elongate and narrow, nearly reaching metacoxae, with apical segment elongate, nearly as long as

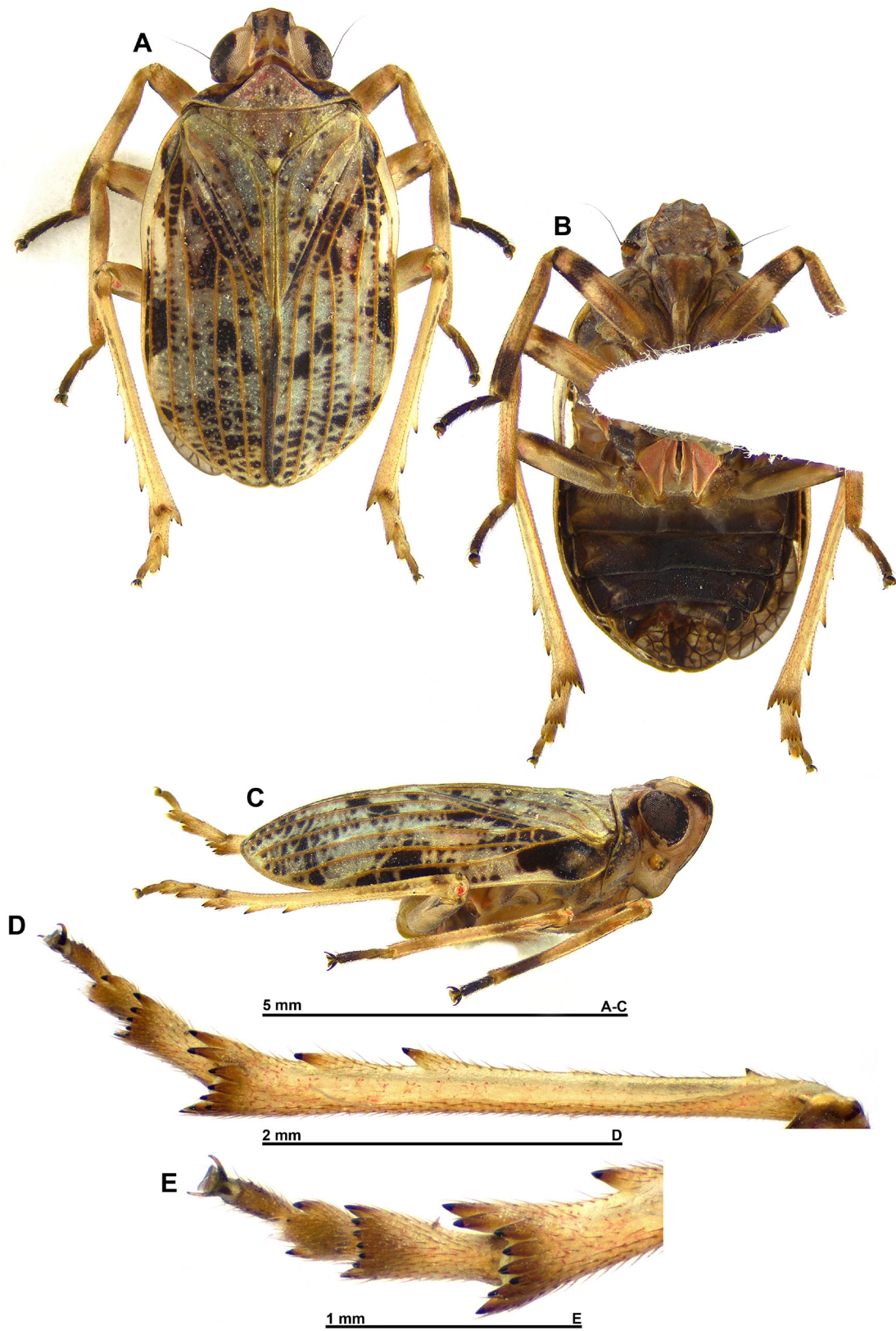


Fig. 12. *Flavina lami* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Right hind leg, ventral view. **E.** Metatarsus and apex of metatibia, ventral view.

penultimate. Eyes reniform (not emarginate) protruding laterally; ocelli absent. Antennae rather short with scape yellowish, ring-shaped and pedicel dark brown on anterior face and yellowish on posterior one, barrel-shaped, slightly longer than broad.

THORAX (Fig. 13A–D). Pronotum with disc (delimited by peridiscal carina) yellowish, smooth, with central depression with two brown impressed points; rather wide dark brown area on dorsal portion of lateral fields, continued along posterior margin of paranotal lobes; yellowish tubercles along posterior margin of paranotal lobes; 0.71 times as long as mesonotum in midline; anterior margin strongly protruding in round angle anteriorly between eyes, with carinae directed obliquely posteriorly, not reaching hind margin of pronotum; posterior margin nearly straight, slightly elevated; median carina obsolete; paranotal lobes (lateral view) broad with hind margin rounded, angularly rounded posteroventrally. Mesonotum variegated yellowish, with brown marking at base of scutellum; subtriangular with nearly complete transverse anterior carina and with obsolete median carina; peridiscal carina weakly marked; disc smooth, slightly depressed in midline. Tegulae dark brown.

TEGMINA (Fig. 12A–C). Variegated pale yellowish, with more or less extensive, scattered, irregular blackish brown markings, larger ones at base of costal cell and at $\frac{2}{3}$ of length along costal margin; tegmina subcoriaceous with longitudinal veins elevated and with dense reticulum of pale veinlets; shape elongate and convex with sides subparallel (weakly bisinuate) in middle portion, about 2.5 times as long as wide; angularly rounded apically. Postclaval margin straight, slightly notched at apex of clavus. Clavus closed, slightly surpassing half of tegmen length. Venation: (Fig. 12A, C) ScP+R moderately developed, forking into subparallel ScP+RA and RP; MP forking rather close to base into diverging MP₁ and MP₂₊₃, with MP₁ running parallel to RP; MP₂ and MP₃ separated at about $\frac{2}{5}$ of tegmen length, then running parallel to MP₁; CuA unforked, parallel to claval joint and curved at apex of clavus, then parallel to postclaval margin; Pcu fused with A1 at $\frac{2}{3}$ of clavus length; Pcu+A1 fused with CuP slightly before apex of clavus.

HIND WINGS (Fig. 13E). Dark brown with paler brown area at base of Pcu, and narrow area along basal portion of ScP+R; veins mostly black, darker than background; wing broader than tegmen and deeply bilobed at CuP; costal margin rather weakly sinuate; CuP-Pcu-A1 lobe nearly twice as wide as ScP-R-MP-CuA lobe, the two lobes almost the same length; both lobes somewhat angularly rounded apically; postclaval margin broadly rounded; A2 lobe brown, reduced and narrow. Venation: main veins present; dense network of cross-veins; ScP+R and MP diverging in basal portion, then running subparallel; CuA running more or less straight; Pcu rather strongly curved around basal third of wing towards CuP; A1 weakly curved, more or less parallel to postclaval margin; vein A2 distinct.

LEGS (Fig. 12A–E). Pro- and mesocoxae yellowish, mesoanteriorly margined with brown; metacoxae brown; trochanters variegated yellowish and brown. Pro- and mesofemora yellow-brown with anteapical brown ring followed by yellowish ring before narrowly brown apex; ventral face darker than dorsal; elongate, rather slender and slightly flattened dorsoventrally. Pro- and mesotibiae yellowish with apex and subbasal ring brown; ventral face darker than dorsal; protibiae more contrasted; tibiae weakly flattened dorsoventrally, narrower and longer than corresponding femora. Pro- and mesotarsi elongate and brown. Metafemora yellowish with elongate brown marking along anteroventral portion. Metatibiae yellowish; lateral spines: 1 subbasal and 2–3 in distal half; 8 apical spines, all spines brown, apically black. First metatarsomere elongate and slender, with a strong spine at each side and a row of 6 smaller spines in between ventrally along posterior margin; second metatarsomere short with one spine at each side, all spines black-brown apically. Metatibiotarsal formula: (3–4) 8 / 8 / 2.

ABDOMEN (Fig. 12B). Dark brown, slightly paler basally.

MALE TERMINALIA. Pygofer (*Py* – Fig. 14A–D) about 2.0 times as high as long (slightly above midheight) in lateral view, with anterior margin nearly straight and posterior margin forming a wide lobe rounded to posterodorsal angle; posterior margin dorsally with deep, V-shaped, rounded excavation. Gonostyli

(*G* – Fig. 14A–C) (in lateral view) longer than high (without dorsal capitulum), projecting posteriorly in distinct elongate lobe rounded apically and with ventral margin weakly rounded; capitulum (*ca* – Fig. 14A–C) directed dorsad, rather massive, wide, falcate and short (about as high as wide), slightly

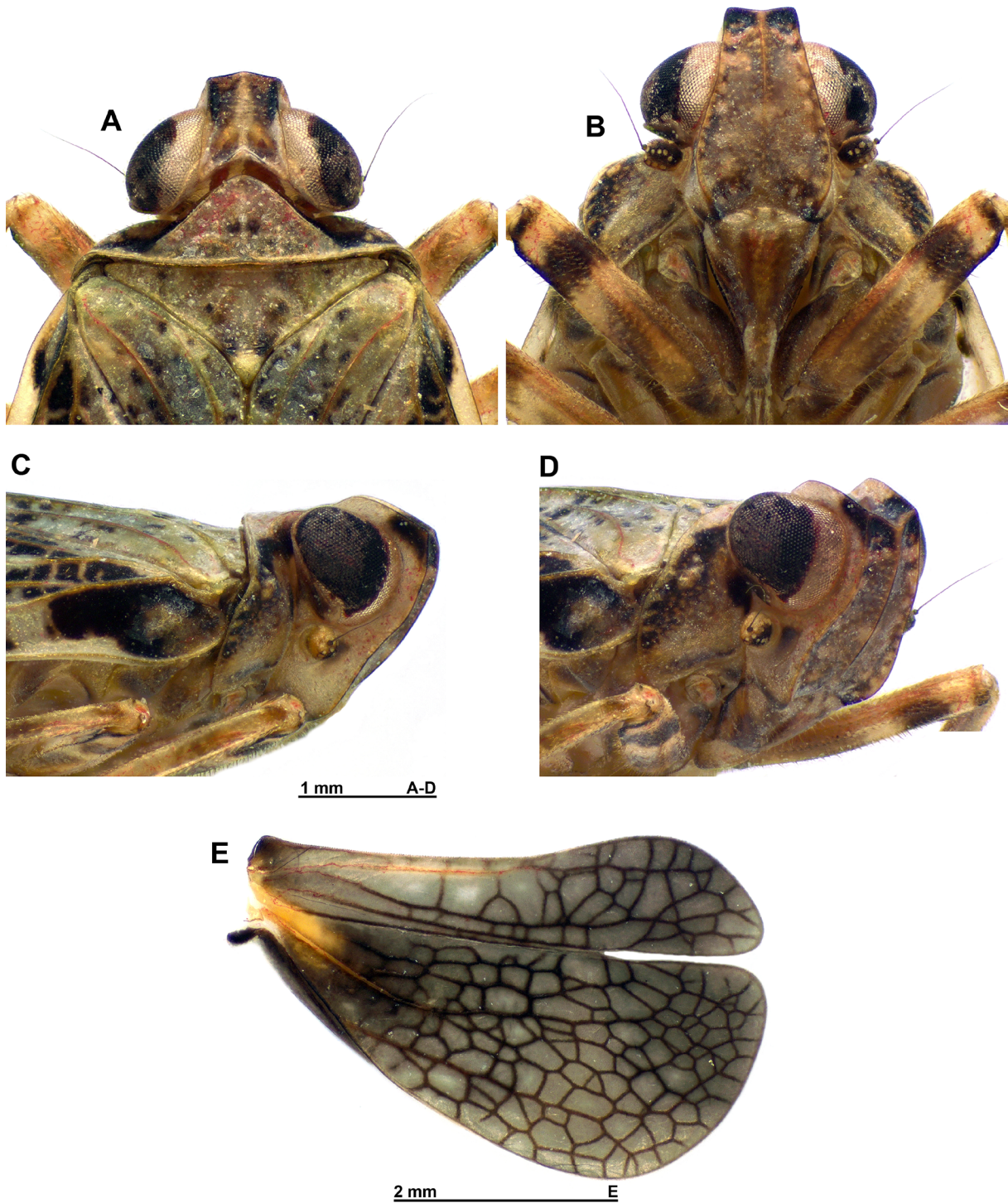


Fig. 13. *Flavina lami* sp. nov., holotype, ♂ (RBINS). **A.** Head and thorax, dorsal view. **B.** Frons, perpendicular view. **C.** Head and thorax, lateral view. **D.** Head and thorax, anterolateral view. **E.** Right hind wing.

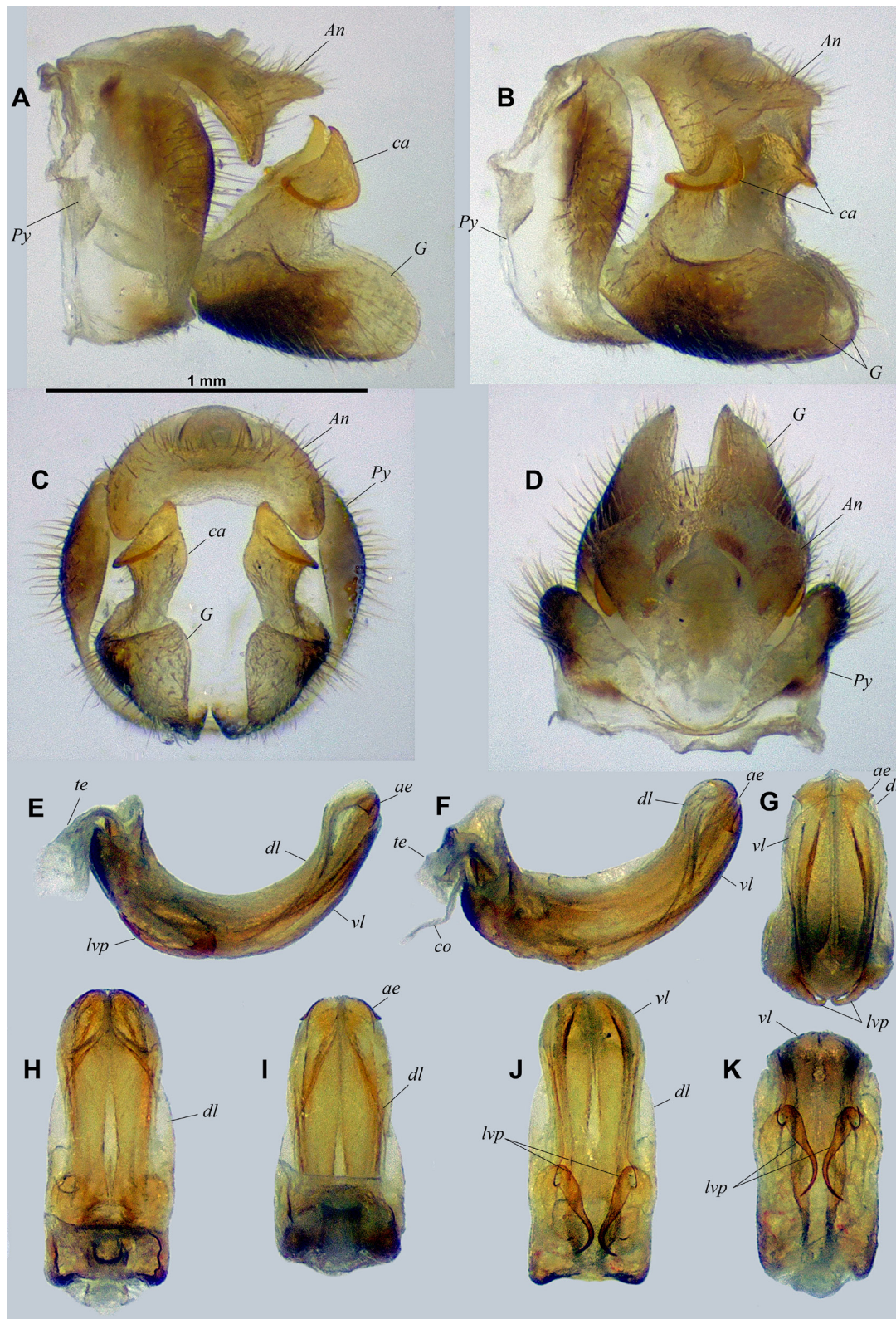


Fig. 14. *Flavina lami* sp. nov., holotype, ♂ (RBINS). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Caudal view. **D.** Dorsal view. **E–K.** Aedeagus. **E.** Left lateral view. **F.** Left laterodorsal view. **G.** Posteroventral view. **H.** Dorsal view. **I.** Anterodorsal view. **J.** Ventral view. **K.** Anteroventral view. Abbreviations: see Material and methods.

twisted, with moderately long, wide neck, and with apical hook directed dorsocephalad; with basal lamina projection directed lateroventrad in caudal view. Aedeagus (Fig. 14E–J) symmetrical, evenly curved dorsad (in lateral view); pair of lateroventral processes (*lvp*) elongate, rather wide in basal portion and directed mesocephalad (weakly sinuate), then tapering, curved laterocephalad and pointed apically; ventral lobe of periandrium (*vl*) rather wide, spatulate with apex slightly excavate, shorter than aedeagus (*ae*) and dorsal lobe (*dl*); aedeagus bilobed apically, each lobe with apical subtriangular process with dorsal margin undulate in caudal view (Fig. 14G), pointing laterocephalad. Connective (*co*) and tectiductus (*te*) weak (maybe not fully mature specimen). Anal tube (*An* – Fig. 14A–D) dorsoventrally flattened, in dorsal view evenly widening to midlength, with apical margin strongly bisinuate with middle portion roundly protruding, with lateral lobes strongly developed, angularly pointing posteroventrad; anal opening before basal $\frac{1}{2}$.

Biology

Flavina lami sp. nov. was collected in July, in montane evergreen tropical forest, at about 1300–1400 m a.s.l. near the summit (Fig. 1D). The specimen was collected on tree trunks densely covered in lichens and mosses. Later fieldwork in April 2017 and May 2023 at the same locality failed to provide additional specimens.

Distribution

Vietnam: Thừa Thiên-Huế Province, summit of Bach Ma National Park (Fig. 1).

Flavina quangi sp. nov.

[urn:lsid:zoobank.org:act:E7483D65-1D70-4F06-AB40-CD01296EA0DE](https://zoobank.org/act:E7483D65-1D70-4F06-AB40-CD01296EA0DE)

Figs 1, 2D, 15–18

Diagnosis

Flavina quangi sp. nov. can be recognized by:

- (1) the moderately narrow dorsal margin of the frons, equal to 0.34 of the length of the frons in midline;
- (2) the vertex without median carina;
- (3) the pronotum with obsolete median carina;
- (4) the mesonotum without median carina and with peridiscal carinae very weakly marked;
- (5) the pygofer subquadrate in lateral view, with ventral $\frac{1}{3}$ of posterior margin deeply emarginate, and dorsal $\frac{2}{3}$ slightly concave;
- (6) the anal tube with apical margin truncate (slightly concave) and lateral lobes well developed, angularly rounded apically and directed posteroventrad;
- (7) the capitulum of the gonostylus massive, wide, subtriangular (about as high as wide), dorsally hooked cephalodorsad, and with wide, rather short neck;
- (8) the lateroventral processes of the aedeagus elongate, rather wide in basal portion and directed mesocephalad (weakly sinuate), then tapering, curved laterocephalad and pointed apically.

Differential diagnosis

The identification key to the species of *Flavina* proposed by Zhang *et al.* (2010) leads to *F. walkeri*, described from “India”. However, from the description and illustrations provided by Signoret (1861), *F. walkeri* differs by the vertex more than 1.5 times as wide as long (about 1.1 times as long as wide in *F. quangi* sp. nov.), the pronotum densely tuberculate on disc and along anterior margin (no tubercles on pronotum in *F. quangi*), the yellowish abdomen (dark brown in *F. quangi*) and the seven lateral spines of the metatibiae (3–4 in *F. quangi*). The species also shares a number of characters with *F. lami* sp. nov., also found in Bach Ma National park, but can be separated from the latter by a larger size (LT = 8.0 mm minimum; 6.6 mm in *F. lami*), the hind margin of the pygofer in lateral view weakly concave in dorsal $\frac{2}{3}$, then strongly emarginate in ventral $\frac{1}{3}$ (broadly rounded in *F. lami*) and the emarginate apical margin of the anal tube of the male in dorsal view (round in *F. lami*).

Etymology

The species epithet is a patronym dedicated to Quang Thanh Nguyễn, one of the rangers who helped us during the fieldwork in Bach Ma National Park.

Type material

Holotype

VIETNAM • ♂; Thừa Thiên-Huế Province, Bach Ma National Park, summit; 16°11'18" N, 107°50'56" E; 11–21 May 2023; 1300–1400 m a.s.l.; J. Constant and L. Semeraro leg.; VNMN.

Paratypes

VIETNAM – Thừa Thiên-Huế Province • 3 ♂♂, 6 ♀♀; same data as for holotype; VNMN • 8 ♂♂, 10 ♀♀; same data as for holotype; I.G.: 34.640; RBINS • 3 ♀♀; Bach Ma National Park, road to Bach Ma Peak; 16°11'45.73" N, 107°51'46.34" E; May 2023; 1325 m a.s.l.; [by] net; Hoai leg.; VNMN • 1 ♀; Bach Ma National Park, stairs going up to Hai Vong Dai; 16°11'53.77" N, 107°51'26.92" E; May 2023; 1272 m a.s.l.; [by] net; Hoai leg.; VNMN • 2 ♀♀; Bach Ma National Park, Pheasant trail; 16°13'41.18" N, 107°51'16.82" E; 15 Sep. 2024; 344 m a.s.l.; [by] net; Hoai leg.; VNMN • 1 ♂, 1 ♀; Bach Ma National Park, road to Bach Ma Peak; 16°11'45.73" N, 107°51'46.34" E; 14 Sep. 2024; 1325 m a.s.l.; [by] net; Hoai leg.; VNMN.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 5): 8.4 mm (8.0–8.6), ♀ (n = 5): 9.3 mm (9.1–9.6); LT/BB = 1.80; LTg/BTg = 2.53; LW/BW = 1.48; BV/LV = 1.13; LF/BF = 1.63.

HEAD (Fig. 16A–D). Narrower than thorax and moderately elongate, with less than half of vertex length surpassing eyes. Vertex variegated brown with median line and basal portion of lateral carinae paler, sometimes also a narrow line behind anterior margin, strongly concave (longitudinally grooved), about 0.88 times as long in midline as broad basally, with sides weakly, evenly converging towards somewhat angular apex; median carina absent; all margins carinate, lateral ones strongly elevated; posterior margin angularly concave. Frons variegated brown, with dense, yellowish, minute pitting, darker along dorsal margin; series of small yellowish tubercles along lateral margins; often a yellowish marking in middle of frons; median carina well marked, extending from dorsal margin to slightly before clypeal suture; dorsal margin rather strongly concave and moderately narrow, 0.34 times as wide as length of frons in midline. Posterior side of head yellowish brown. Genae yellowish with brown to black-brown markings, at anterodorsal angle, anterior to base of antennae, and along clypeal suture. Clypeus more or less coloured as frons with pale median stripe, flat in middle portion, moderately elongate, subtriangular with fronto-clypeal suture rounded; anteclypeus yellowish, brown apically, with median blunt carina. Labium yellowish, elongate and narrow, slightly surpassing mesocoxae, with apical segment elongate, nearly as long as penultimate. Eyes reniform (not emarginate) protruding laterally; ocelli absent. Antennae rather short with scape yellowish, ring-shaped and pedicel dark brown on anterior face and yellowish on posterior one, barrel-shaped, slightly longer than broad.

THORAX (Fig. 16A–D). Pronotum with disc (delimited by peridiscal carina) variegated yellowish brown, usually with rather wide median brown band, smooth, with central depression with two brown impressed points; some more or less distinct yellowish tubercles on disc, along posterior margin of lateral fields and at posterodorsal angles of paranotal lobes; wide dark brown area on dorsal portion of lateral fields, continued on most surface of paranotal lobes; paranotal lobes usually with yellowish marking in middle of ventral portion; 0.60 times as long as mesonotum in midline; anterior margin strongly protruding in round angle anteriorly between eyes, with carinae directed obliquely posteriorly, not reaching hind margin of pronotum; posterior margin weakly rounded, slightly elevated; median carina obsolete; paranotal lobes (lateral view) broad with hind margin rounded, angularly rounded

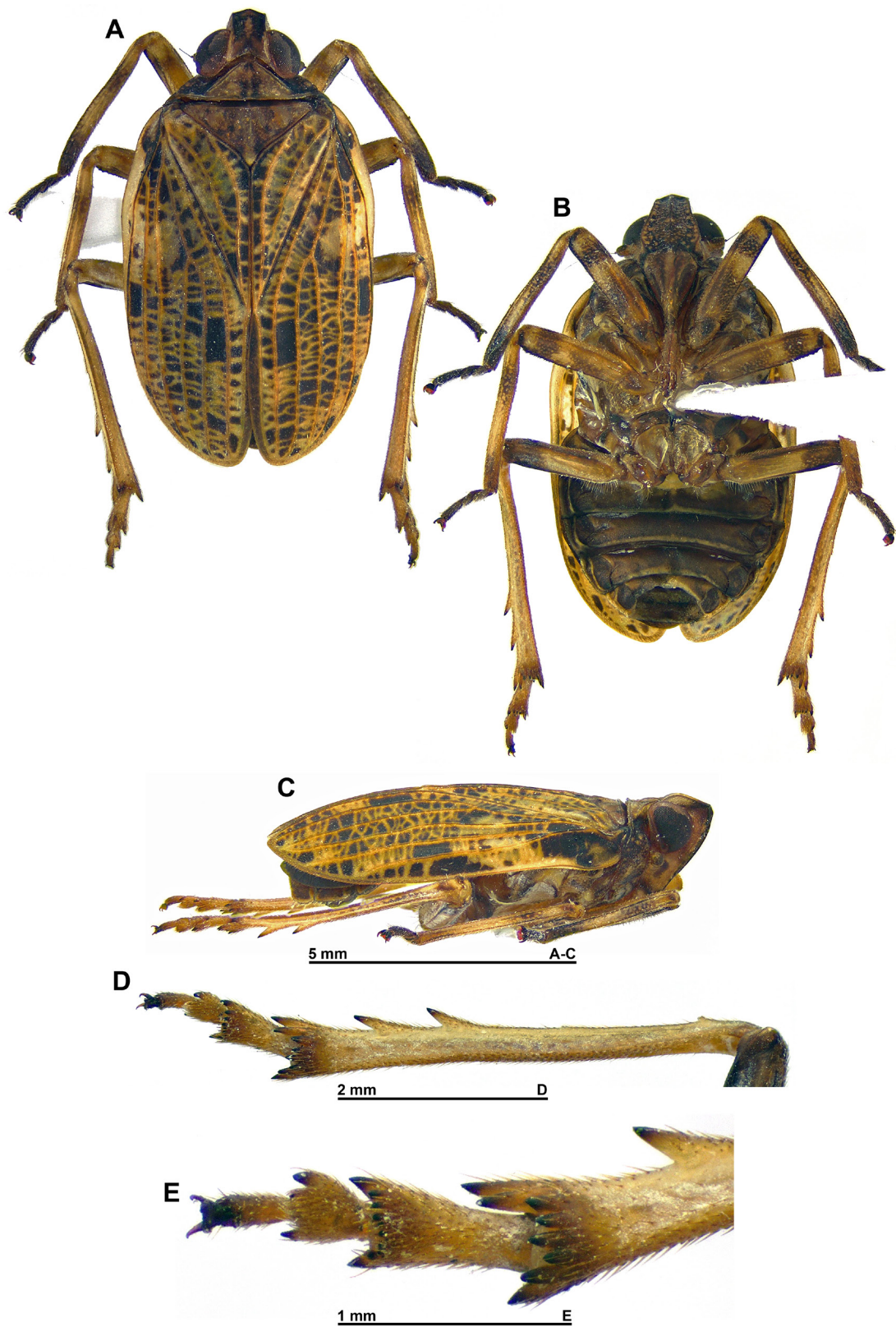


Fig. 15. *Flavina quangi* sp. nov., dissected holotype, ♂ (VNMN). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Right hind leg, ventral view. E. Metatarsus and apex of metatibia, ventral view.

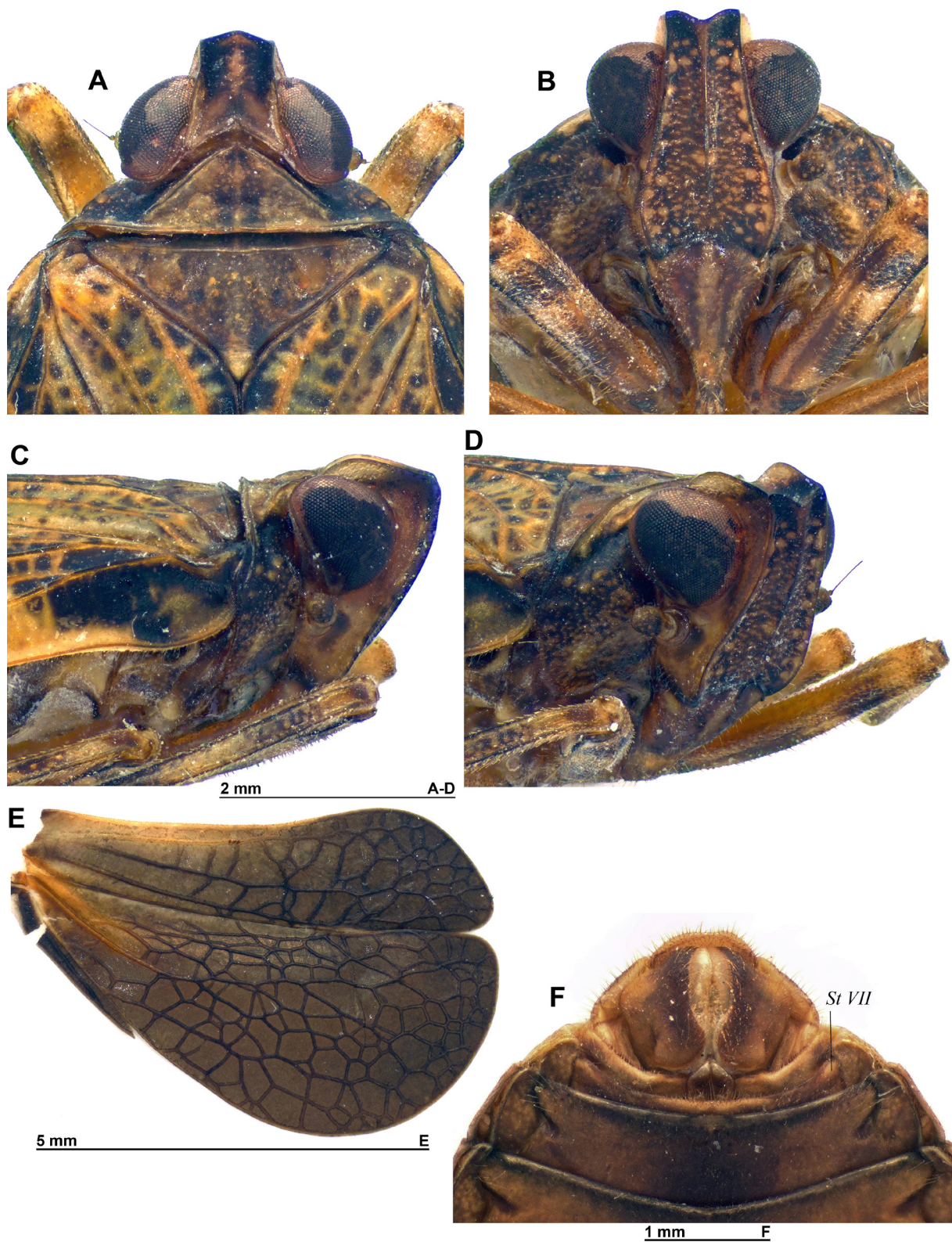


Fig. 16. *Flavina quangi* sp. nov. A–E. Holotype ♂ (VNMN). A. Head and thorax, dorsal view. B. Frons, perpendicular view. C. Head and thorax, lateral view. D. Head and thorax, anterolateral view. E. Right hind wing. F. Paratype ♀ (VNMN), terminalia, ventral view. Abbreviation: see Material and methods.

posteroventrally. Mesonotum variegated yellowish brown, with paler scutellum; subtriangular with nearly complete transverse anterior carina and with obsolete median carina; peridiscal carina weakly marked; disc smooth, slightly depressed in midline. Tegulae dark brown.

TEGMINA (Figs 15A–C, 18). Variegated yellowish brown, sometimes washed with green, with more or less extensive, scattered, irregular blackish brown markings; sometimes with more or less distinct subtriangular paler area before midlength; tegmina subcoriaceous with longitudinal veins elevated and with dense reticulum of paler veinlets; shape elongate and convex with sides broadly rounded, subparallel in middle portion, about 2.5 times as long as wide; rather narrowly rounded apically. Postclaval margin straight, slightly notched at apex of clavus. Clavus closed, reaching about $\frac{3}{5}$ of tegmen. Venation (Fig. 15A, C): ScP+R moderately developed, forking into subparallel ScP+RA and RP; MP forking rather close to base into diverging MP_1 and MP_{2+3} ; MP_2 and MP_3 separated at about $\frac{2}{5}$ of tegmen length, MP_2 and MP_3 running subparallel to MP_1 ; CuA unforked, parallel to claval joint and curved at apex of clavus, then parallel to postclaval margin; Pcu fused with A1 at $\frac{2}{3}$ of clavus length; Pcu+A1 fused with CuP slightly before apex of clavus.

HIND WINGS (Fig. 16E). Dark brown with paler areas along costal margin following vein ScP+R, and along basal portion of Pcu; veins mostly coloured darker than background; wing broader than tegmen and deeply bilobed at CuP; costal margin rather weakly sinuate; CuP-Pcu-A1 lobe nearly 1.5 times as wide as ScP-R-MP-CuA lobe, the two lobes almost the same length; both lobes somewhat angularly rounded apically; postclaval margin broadly rounded; A2 lobe brown, reduced and narrow. Venation: main veins present, dense network of cross-veins; ScP+R parallel to costal margin; MP and CuA running more or less parallel; Pcu rather strongly curved before basal half of wing towards CuP; A1 curved, more or less parallel to postclaval margin; vein A2 distinct.

LEGS (Fig. 15A–E). Coxae yellowish with anterior margin brown; trochanters variegated yellowish and brown. Pro- and mesofemora yellowish with brown wide median, and anteapical rings; ventral face darker than dorsal; elongate, rather slender and slightly flattened dorsoventrally. Pro- and mesotibiae yellowish with brown more or less distinct subbasal ring; apex brown; tibiae weakly flattened dorsoventrally, narrower and longer than corresponding femora. Pro- and mesotarsi elongate and brown. Metafemora yellowish with ventral apical marking and elongate marking along anterior face, brown. Metatibiae yellowish, with one lateral spine near base (sometimes weak to obsolete), 2 lateral spines in distal half, and 8 apical spines, all spines brown, apically black. First metatarsomere elongate and slender, with a strong spine at each side and a row of 6 smaller spines in between ventrally along posterior margin; second metatarsomere short with one spine at each side, all spines black-brown apically. Metatibiotarsal formula: (2–3) 8 / 8 / 2.

ABDOMEN (Fig. 15B). Brown with basal segment yellowish.

MALE TERMINALIA. Pygofer (*Py* – Fig. 9A–D) massive, about 1.8 times as high as long (at ventral $\frac{1}{3}$) in lateral view, with anterior margin weakly sinuate and posterior margin, along dorsal $\frac{2}{3}$ more or less oblique and weakly concave then abruptly rounded at posterodorsal angle, in ventral $\frac{1}{3}$, rather strongly excavate; posterior margin dorsally with deep, open-U-shaped excavation. Gonostyli (*G* – Fig. 9A–C) (in lateral view) longer than high (without dorsal capitulum), projecting posteriorly in distinct elongate lobe rounded apically and with ventral margin broadly rounded; capitulum (*ca* – Fig. 9A–C) massive, wide, subtriangular (about as high as wide), slightly twisted, dorsally hooked cephalodorsad, and with wide, rather short neck with posterior margin rounded, and with basal lamina projection directed lateroventrad in caudal view. Aedeagus (Fig. 9E–J) symmetrical, evenly curved dorsad (in lateral view); pair of lateroventral processes (*lvp*) elongate, rather wide in basal portion and directed mesocephalad (weakly sinuate), then tapering, curved laterocephalad and pointed apically; ventral lobe of perianthrium (*vl*) rather wide, spatulate, weakly notched apically, shorter than aedeagus (*ae*) and dorsal lobe (*dl*); aedeagus

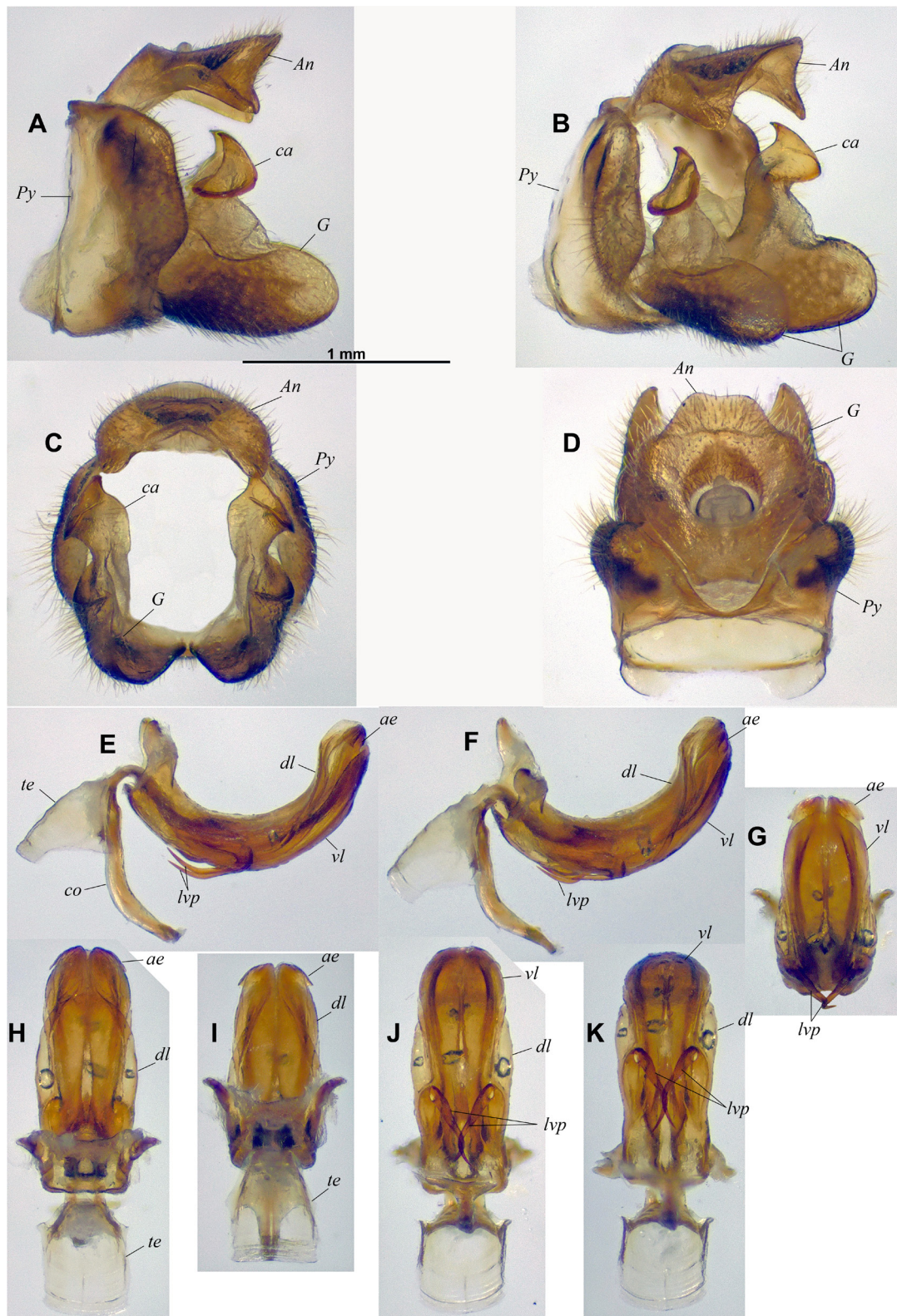


Fig. 17. *Flavina quangi* sp. nov., holotype, ♂ (VNMN). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Caudal view. **D.** Dorsal view. **E–K.** Aedeagus. **E.** Left lateral view. **F.** Left laterodorsal view. **G.** Posteroventral view. **H.** Dorsal view. **I.** Anterodorsal view. **J.** Ventral view. **K.** Anteroventral view. Abbreviations: see Material and methods.



Fig. 18. *Flavina quangi* sp. nov., live specimens in Bach Ma National Park, summit. **A–B.** 14 May 2023. **C–E.** 21 May 2023. **F.** 14 May 2023. **G.** 13 May 2023. **H.** 11 May 2023.

bilobed apically, each lobe with apical subtriangular process pointing laterocephalad. Connective (*co*) well developed, elongate, curved, with tectiductus (*te*) well developed, widely open. Anal tube (*An* – Fig. 9A–D) dorsoventrally flattened, in dorsal view widening from base towards apex in proximal half, then abruptly narrowing with apical margin truncate (slightly concave); lateral lobes well developed, angularly rounded apically and directed posteroventrad; anal opening before basal ½.

FEMALE TERMINALIA. Hind margin of sternum VII (*St VII* – Fig. 16F) concave, moderately inflated in middle portion.

Biology

Flavina quangi sp. nov. was collected in May and September, in montane evergreen tropical forest, at about 1300–1400 m a.s.l., near the summit (Fig. 2D), and in September in lowland evergreen forest in Bach Ma, at altitudes around 300–400 m a.s.l. (Fig. 2A). The species seemed rather common at that moment and specimens were collected on tree trunks densely covered in lichens and mosses while a few were also found sitting on leaves of lower plants and bushes (Fig. 18). However, previous fieldwork in July 2011 and April 2017 at the same locality did not provide any specimens. When disturbed, they tend to walk away and hide on the opposite side of the trunk or branch, and jump away as a last solution.

Distribution

Vietnam: Thừa Thiên-Huế Province, Bach Ma National Park (Fig. 1).

Genus *Gelastyrella* Yang, 1994

Gelastyrella Yang, 1994 in Chan & Yang, 1994: 90. Type species: *Gelastyrella litaoensis* Yang, 1994, by original designation.

Diagnosis

The genus *Gelastyrella* can be differentiated from the other genera of Parahiraciina by the following combination of characters (based on Zhang *et al.* 2020):

- (1) the frons about as long as wide, with median carina and a transverse carina under the dorsal margin;
- (2) the tegmina tapering towards apex, with vein ScP+R forked near base, MP 3-branched with first fork around midlength and CuA unforked;
- (3) the tri-lobed hind wings (with A2 lobe reduced);
- (4) the first metatarsomere with a dense pad of spines ventrally, in addition to spines of the apical margin;
- (5) the ventral lobe of the periandrium strongly expanded basiventrally in rounded lobes;
- (6) the aedeagus with one pair of lateroventral processes and well developed suspensorium.

Species included (distribution)

Gelastyrella litaoensis Yang, 1994 (China (Hainan, Fujian, Guangxi); Taiwan; Vietnam – Chan & Yang 1994; Gnezdilov *et al.* 2014a; Gnezdilov 2015).

Gelastyrella litaoensis Yang, 1994

Figs 2B, D, 19–23

Gelastyrella litaoensis Yang, 1994 in Chan & Yang, 1994: 90, fig. 36 (described from Taiwan, head, wings, male and female terminalia illustrated).

Gelastyrella hainanensis Ran & Liang, 2006: 65 (64 (keyed), 65, figs 1–8 (described from China, Hainan; head, tegmen and terminalia illustrated – synonymized by Gnezdilov *et al.* 2014a: 88).

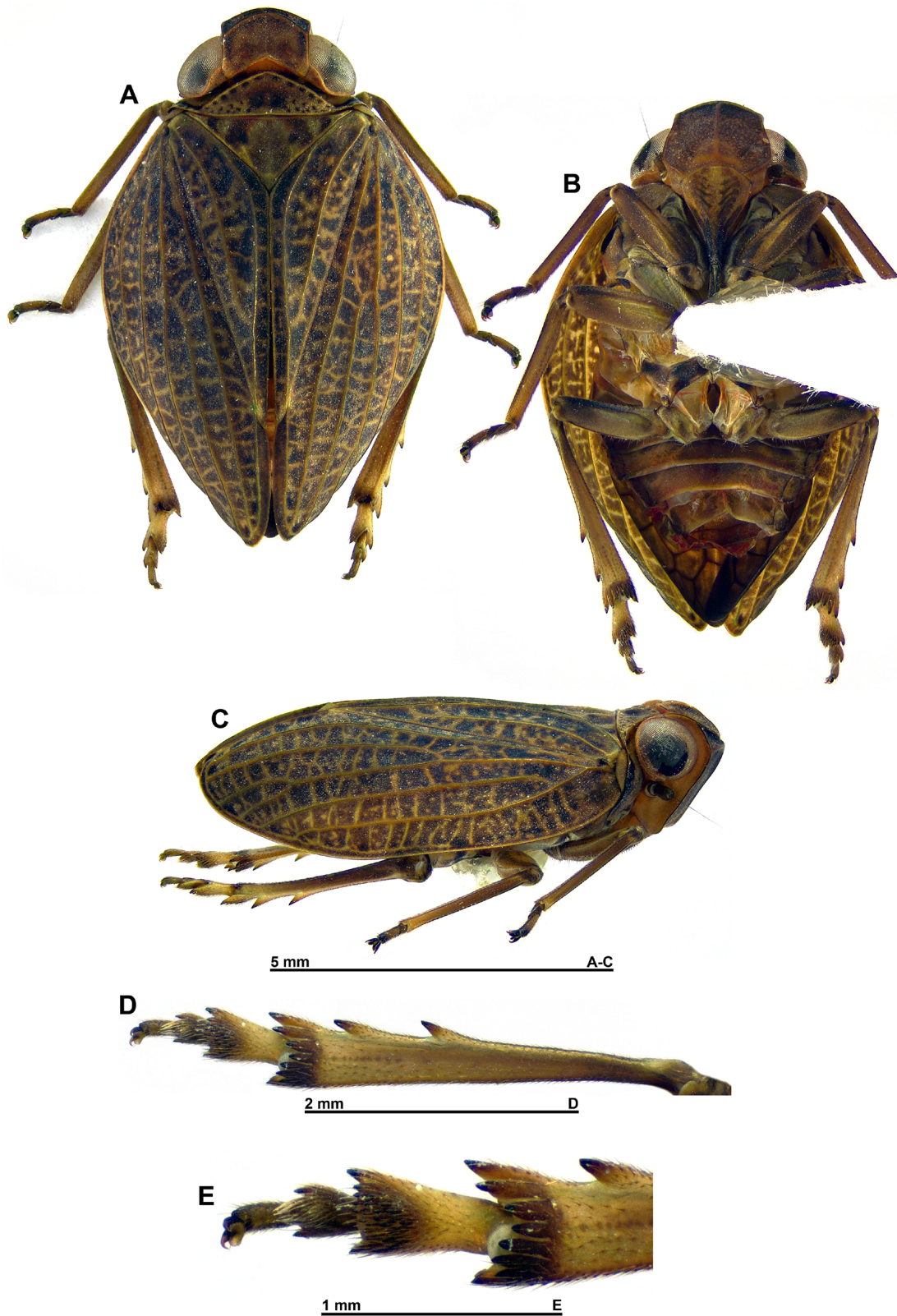


Fig. 19. *Gelastyrella litaoensis* Yang, 1994, dissected ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Right hind leg, ventral view. **E.** Metatarsus and apex of metatibia, ventral view.

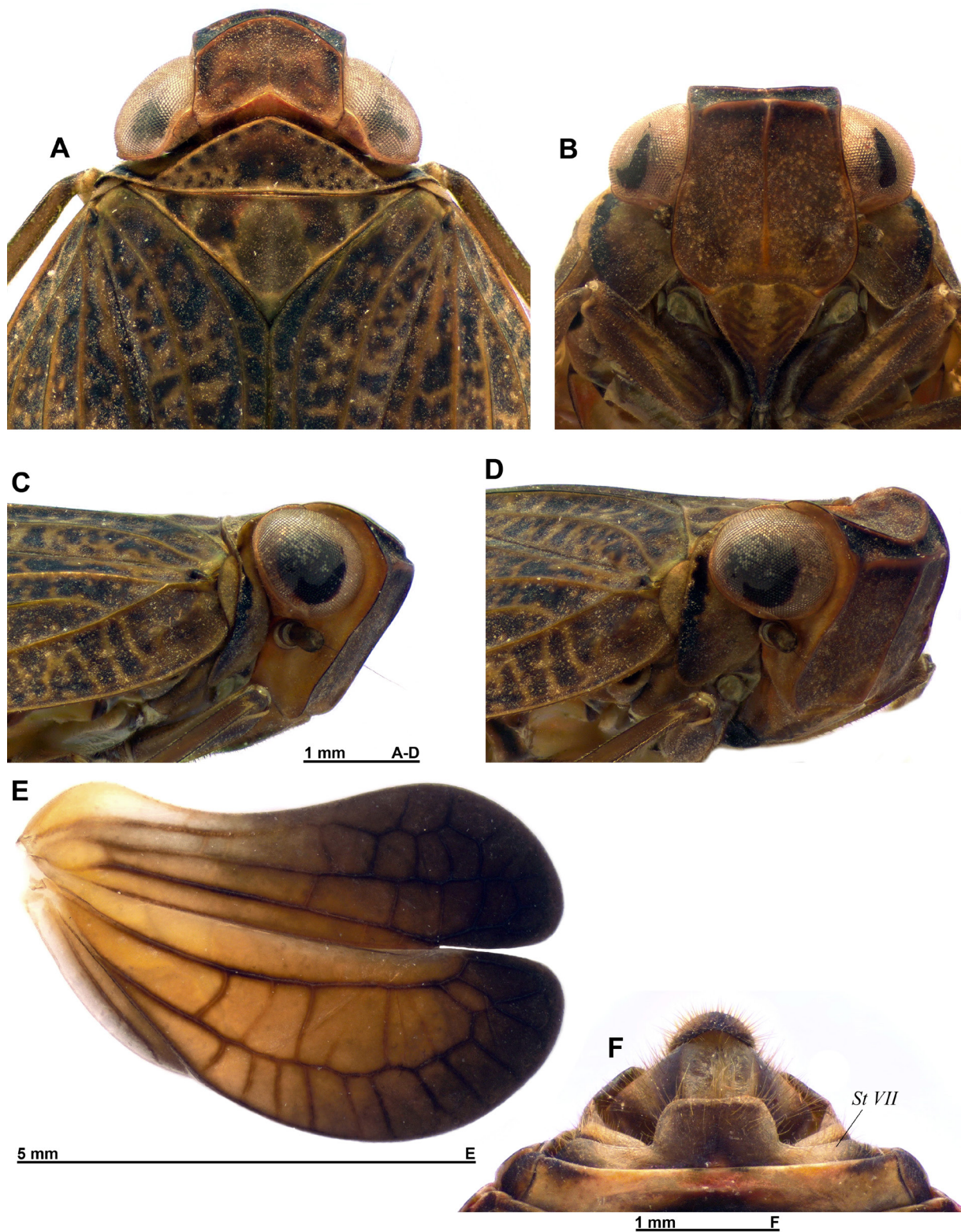


Fig. 20. *Gelastyrella litaoensis* Yang, 1994. A–E. ♂ (RBINS). A. Head and thorax, dorsal view. B. Frons, perpendicular view. C. Head and thorax, lateral view. D. Head and thorax, anterolateral view. E. Right hind wing. F. ♀ (RBINS), terminalia, ventral view. Abbreviation: see Material and methods.

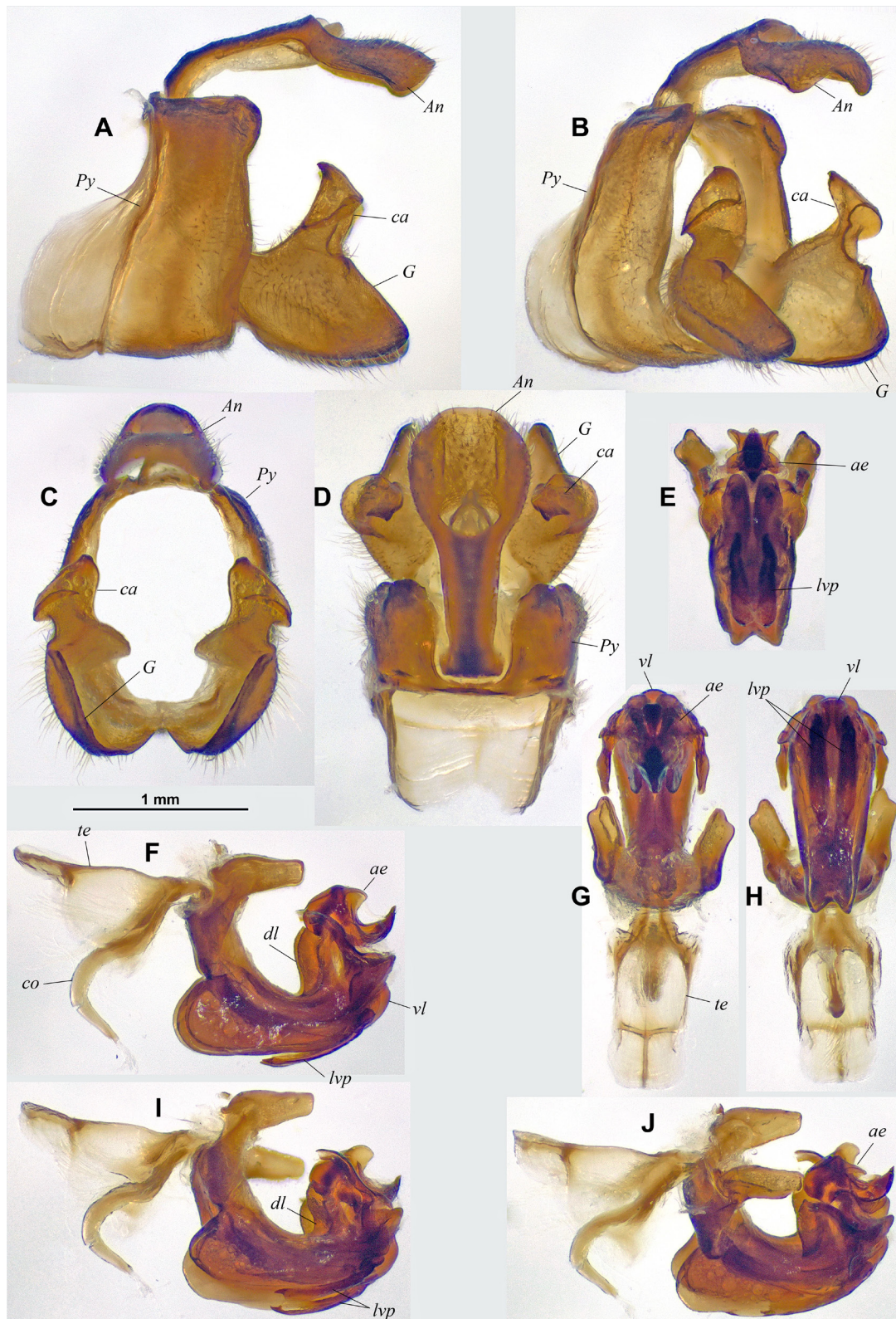


Fig. 21. *Gelastyrella litaoensis* Yang, 1994, ♂ (VNMN). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Caudal view. **D.** Dorsal view. **E–J.** Aedeagus. **E.** Caudal view. **F.** Left lateral view. **G.** Dorsal view. **H.** Ventral view. **I.** Lateroventral view. **J.** Laterodorsal view. Abbreviations: see Material and methods.

Thabena litaoensis – Gnezdilov 2009: 80 (transferred to *Thabena* Stål, 1866, new records from Taiwan); 2015: 332–333 (distribution, notes). — Zhang & Chen 2012: 229 (keyed), 230, figs 10–18 (redescribed, recorded from China, Hainan; head, wings and terminalia illustrated). — Gnezdilov *et al.* 2014a: 88 (first record from Vietnam, Hoa Binh, senior synonym of *G. hainanensis*).

Thabena hainanensis – Gnezdilov 2009: 80 (transferred to *Thabena* Stål, 1866). — Zhang & Chen 2012: 229 (keyed), 232 (listed).

Gelastyrella hainanensis – Chen *et al.* 2014: 133, fig. 2–72 (described, habitus, details and terminalia illustrated).

Gelastyrella litaoensis – Constant & Pham 2024: 78 (listed from Vietnam).

Diagnosis

Gelastyrella litaoensis is the only species of the genus *Gelastyrella* and its identification can be confirmed by the characters of the habitus and terminalia (Figs 19–21).

Material examined

VIETNAM – **Thừa Thiên-Huế Province** • 1 ♂, 1 ♀; Bach Ma National Park; 16°11'44" N, 107°50'44" E; 1200–1300 m a.s.l.; 22 May 2023; J. Constant and L. Semeraro leg.; roadside; VNMN • 1 ♂, 1 ♀; Bach Ma National Park summit; 16°11'18" N, 107°50'56" E; 1300–1400 m a.s.l.; 11–21 May 2023; J. Constant and L. Semeraro leg.; I.G.: 34.640; RBINS • 1 ♂; Bach Ma National Park, Pheasant trail; 16°13'41.18" N, 107°51'16.82" E; 15 Sep. 2024; 344 m a.s.l.; [by] net; Hoai leg.; VNMN. – **Thanh Hoa**



Fig. 22. *Gelastyrella litaoensis* Yang, 1994, live specimens in Bach Ma National Park, summit, 14 May 2023.

Province • 1 ♂; Pu Luong National Park; 20°27'48" N, 105°07'38" E; 5–10 Aug. 2022; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS. – **Ninh Binh Province** • 1 ♂, 1 ♀; Cuc Phuong National Park; 20°19'00" N, 105°36'30" E; 19–23 Jul. 2011; J. Constant and J. Bresseel leg.; I.G.: 31.933; RBINS • 1 ♀; same data as for preceding; 11–18 Aug. 2010; J. Constant and P. Limbourg leg.; I.G.: 31.668; RBINS. – **Quang Tri Province** • 1 ♀; Huong Hoa, Huong Phung, Deo Sa Mu; [16°48'00" N, 106°35'10" E]; 4 Jun. 2006; 900–1000 m a.s.l.; H.T. Pham leg.; VNMN.

Supplementary description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 5): 8.1 mm (7.9–8.5), ♀ (n = 3): 8.9 mm (8.4–9.2); LT/BB = 1.57; LTg/BTg = 2.1; LW/BW = 1.51; BV/LV = 1.98; LF/BF = 1.03.



Fig. 23. *Gelastystrella litaensis* Yang, 1994, distribution in Vietnam.

Biology

Gelastystrella litaoensis was collected in May to September. The specimens were found on tree trunks densely covered in lichens and mosses (Fig. 22) but were also sometimes swept from lower vegetation and bushes. The habitat of the species consists of montane evergreen tropical forest as well as lowland evergreen forest, at altitudes varying from about 300 m a.s.l. in Cuc Phuong and Bach Ma national parks, to 1400 m a.s.l. in Bach Ma (Fig. 2).

Distribution

China: Hainan, Fujian, Guangxi; Taiwan; Vietnam: Hoa Binh, Ninh Binh, Quang Tri, Thanh Hoa and Thừa Thiên-Huế provinces (Fig. 23). The species is here recorded from the four latter provinces for the first time.

Genus *Pseudochoutagus* Che, Zhang & Wang, 2011

Pseudochoutagus Che, Zhang & Wang, 2011: 63. Type species: *Pseudochoutagus curvativus* Che, Zhang & Wang, 2011, by original designation.

Diagnosis

The genus *Pseudochoutagus* can be differentiated from all other genera of Parahiraciina by the following combination of characters (Che *et al.* 2011; Constant 2021):

- (1) head prolonged anteriorly by an elongate, straight, acutely pointed cephalic process;
- (2) vertex and distal half of frons with moderate median carina;
- (3) sides of body rounded;
- (4) metatibiae with seven apical spines;
- (5) anal tube of male spatulate and with apical margin weakly emarginate;
- (6) aedeagus with pair of long asymmetrical, basiventral processes projecting cephalad then reflexed and distally sinuate;
- (7) pygofer subrectangular in lateral view, without posterior process.

Note

The genus was described by Che *et al.* (2011) to include a species from Hainan Island in China. An additional species was described shortly after from North Vietnam (Gnezdilov & Constant 2012). The two new species described hereafter greatly extend the distribution of the genus to the south.

Species included (distribution)

Pseudochoutagus curvativus Che, Zhang & Wang, 2011 (China (Hainan) – Che *et al.* 2011)

Pseudochoutagus lindae sp. nov.

Pseudochoutagus rubens Gnezdilov & Constant, 2012 (Vietnam – Gnezdilov & Constant 2012)

Pseudochoutagus trungii sp. nov.

Pseudochoutagus lindae sp. nov.

[urn:lsid:zoobank.org:act:F1161917-6FB3-44BC-AB0E-D9BF58C41568](https://zoobank.org/urn:lsid:zoobank.org:act:F1161917-6FB3-44BC-AB0E-D9BF58C41568)

Figs 1, 24–27

Diagnosis

Pseudochoutagus lindae sp. nov. can be recognized by:

- (1) the mostly bright green colour of the insect (Figs 24A–C, 27C–E);
- (2) the yellow-brown colour of the hind wings (Fig. 25E).

Differential diagnosis

The species can be differentiated from all other species of *Pseudochoutagus* by the green colour of the tegmina, dark brown to dark reddish brown in the other species. It resembles superficially *Laohiracia*

acuta (see illustrations in Constant 2021; Constant & Pham 2023), which shares a green colour of the body and an elongate cephalic process but differs by the cephalic process slightly upcurved distally (straight in *Laohiracia*) and with very weak dorsal and ventral median carinae (carinae very distinct at least on distal half in *Laohiracia*), the anterior margin of pronotum sinuate but not strongly projecting anteriorly, the hind wings are less reticulate with vein Pcu weakly curved and well distinct (dense network of cross-veins and vein Pcu rather strongly curved at basal $\frac{1}{3}$ and poorly distinct after nodal line in *Laohiracia*).

Etymology

The species epithet is dedicated to JC's wonderful partner Linda Semeraro who found all the specimens of the type series in Bach Ma National Park during our 2023 expedition.

Type material

Holotype

VIETNAM • ♂ (dissected – Figs 24–26); Thừa Thiên-Huế Province, Bach Ma National Park, YesHue Eco; 16°13'05" N, 107°43'27" E; 17 May 2023; 200–300 m a.s.l.; J. Constant and L. Semeraro leg.; VNMN.

Paratypes

VIETNAM • 1 ♀; same data as for holotype; VNMN • 1 ♂, 1 ♀; same data as for holotype; I.G.: 34.640; RBINS.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 2): 10.1 mm, ♀ (n = 2): 11.6 mm (11.4–11.8); LT/BB = 3.02; LTg/BTg = 2.6; LW/BW = 1.87; BV/LV = 0.35; LF/BF = 3.15.

HEAD (Fig. 25A–D). Strongly elongated anteriorly in cephalic process; vertex olivaceous green, usually getting slightly darker towards apex; distinctly longer in midline than broad before eyes (nearly 2.9 times), widening from base to anterior margin of eyes, tapering beyond eyes to midlength, then with sides parallel to rounded apex, median carina weakly distinct, lateral carinae distinct; posterior margin moderately incurved. Side of head brown, darker than vertex anteriorly on cephalic process, yellowish under eye to clypeal suture. Frons yellowish in basal portion then turning dark brown from middle of eyes towards apex, with yellow area extended anteriorly in middle; lateral carinae reaching apex, median carina distinct in distal half; elongate, widest slightly anterior to eyes, roundly tapering towards clypeal suture; clypeal suture rounded. Clypeus black-brown with base shortly yellow, weakly elevated medially in distal portion. Labium brown with last segment longer than broad, and shorter than penultimate. Antennae dark brown; scape short, ring-shaped; pedicel bulbous.

THORAX (Fig. 25A–D). Pronotum yellowish brown; about $\frac{2}{3}$ of length of mesonotum in midline; anterior margin weakly carinate, sinuate and moderately protruding anteriorly between eyes, with peridiscal carinae weakly distinct; posterior margin nearly straight; no median carina but with impressed point on each side of median line; weak, blunt tubercles along anterior and posterior margins; paranotal lobes (lateral view) moderately broad, turning dark brown in lower portion, under level of eye and with posteroventral angle rather acutely rounded. Mesonotum yellowish brown with longitudinal carinae obsolete; two black-brown impressed points on disc and smaller black-brown point near anterolateral angle. Tegulae yellowish brown.

TEGMINA (Figs 24A–C, 27C–E). Green (tending to fade to yellow in collection specimens), narrowly washed with brown along apical margin; subcoriaceous with longitudinal veins distinct and with dense

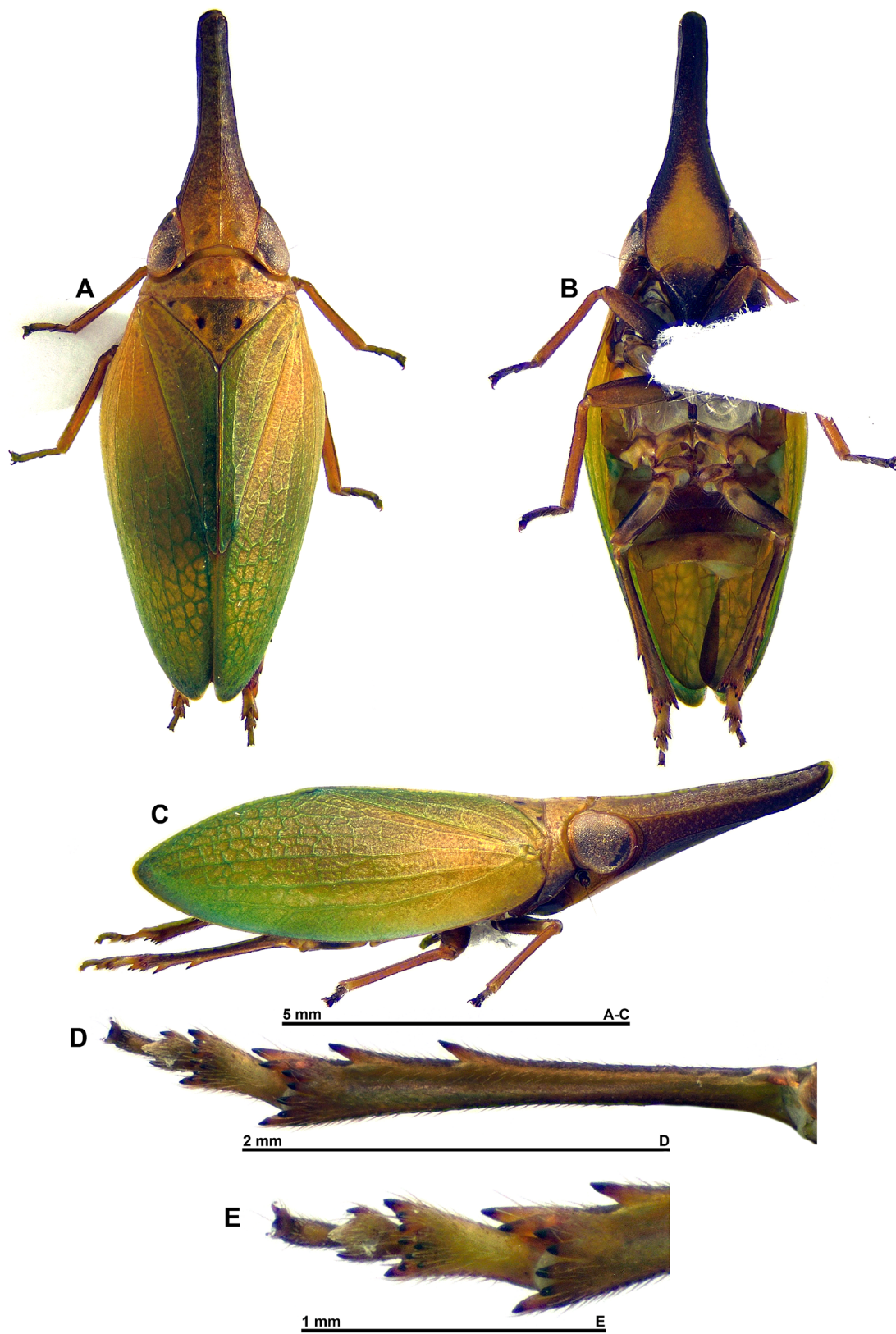


Fig. 24. *Pseudochoutagus lindae* sp. nov., dissected holotype, ♂ (VNMN). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Right hind leg, ventral view. **E.** Metatarsus and apex of metatibia, ventral view.

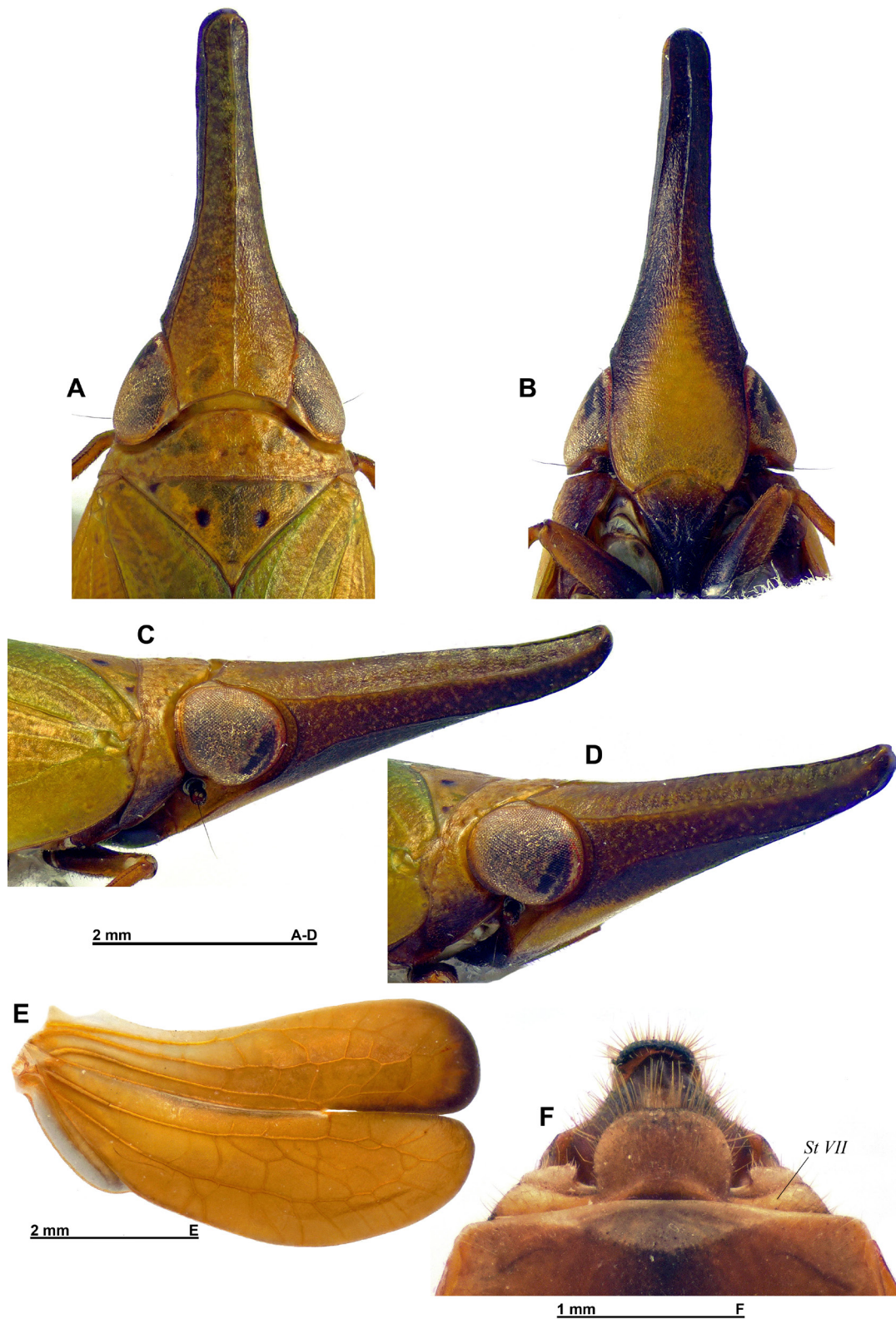


Fig. 25. *Pseudochoutagus lindae* sp. nov. A–E. Holotype ♂ (VNMN). A. Head and thorax, dorsal view. B. Frons, perpendicular view. C. Head and thorax, lateral view. D. Head and thorax, anterolateral view. E. Right hind wing. F. Paratype ♀ (RBINS), terminalia, ventral view. Abbreviation: see Material and methods.

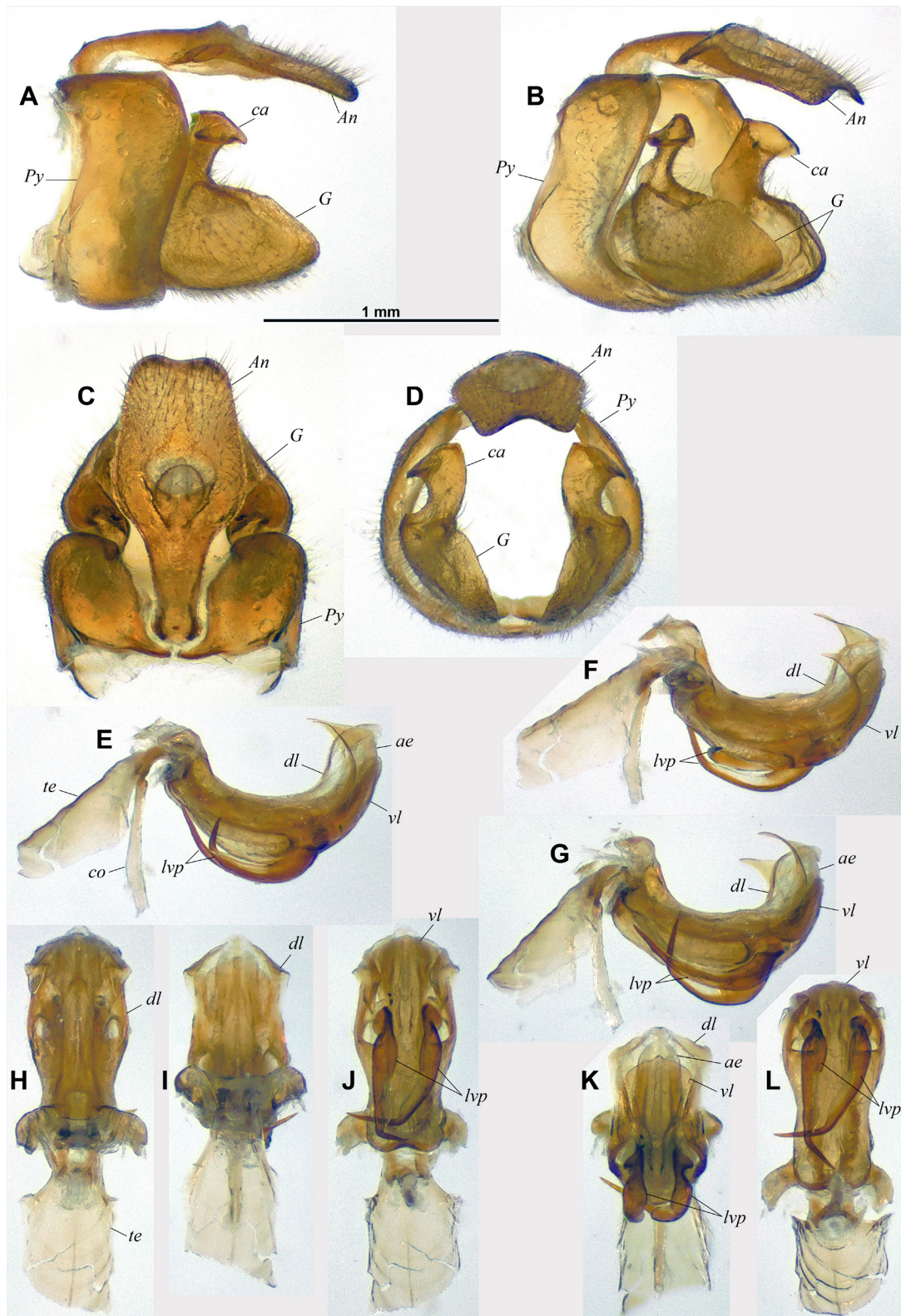


Fig. 26. *Pseudochoutagus lindae* sp. nov., holotype, ♂ (VNMN). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Dorsal view. **D.** Caudal view. **E–L.** Aedeagus. **E.** Left lateral view. **F.** Left laterodorsal view. **G.** Left lateroventral view. **H.** Dorsal view. **I.** Anterodorsal view. **J.** Ventral view. **K.** Posteroventral view. **L.** Anteroventral view. Abbreviations: see Material and methods.

reticulum of veinlets; shape elongate and convex with sides broadly rounded, widest at basal $\frac{1}{3}$, about 2.7 times as long as broad; narrowly rounded apically. Postclaval margin nearly straight, very weakly rounded on distal half, and notched at apex of clavus. Clavus closed, reaching about $\frac{2}{3}$ of tegmen. Venation: ScP+R forking close to base after short common stem, ScP+RA and RP running more or less parallel to costal margin; MP forked slightly before basal $\frac{1}{3}$, resulting veins running more or less parallel; CuA weakly diverging from claval joint and forked before apex of latter; Pcu and A_1 fused at distal $\frac{1}{4}$ of clavus, resulting Pcu+ A_1 reaching claval joint before apex of clavus; dense reticulum of veinlets, especially beyond basal $\frac{1}{3}$.

HIND WINGS (Fig. 26E). Yellow-brown turning to dark brown along margin in distal portion of lobe Sc-R-MP-CuA and narrowly along margin in distal portion of lobe CuP-Pcu- A_1 , A_2 lobe brown; venation concolourous; wing slightly broader than tegmen and deeply bilobed at CuP; costal margin moderately sinuate; CuP-Pcu- A_1 lobe broadly rounded along postclaval margin and about 1.2 times as wide as Sc-R-MP-CuA lobe, both about the same length and apically rounded; A_2 lobe moderately reduced and narrow. Venation: longitudinal veins ScP-R-MP-Cu well distinct; Pcu and A_1 separated; numerous cross-veins; A_2 distinct, well developed.

LEGS (Fig. 24A–E). Moderately elongate, slender; femora brown, darker in basal portion, wider than corresponding tibiae; tibiae paler than corresponding femora, yellow-brown; pro- and meso tarsi black; metatibiae with 2 lateral spines in distal half and 7 apical spines. Metatibiotarsal formula: (2) 7 / 9 / 2.

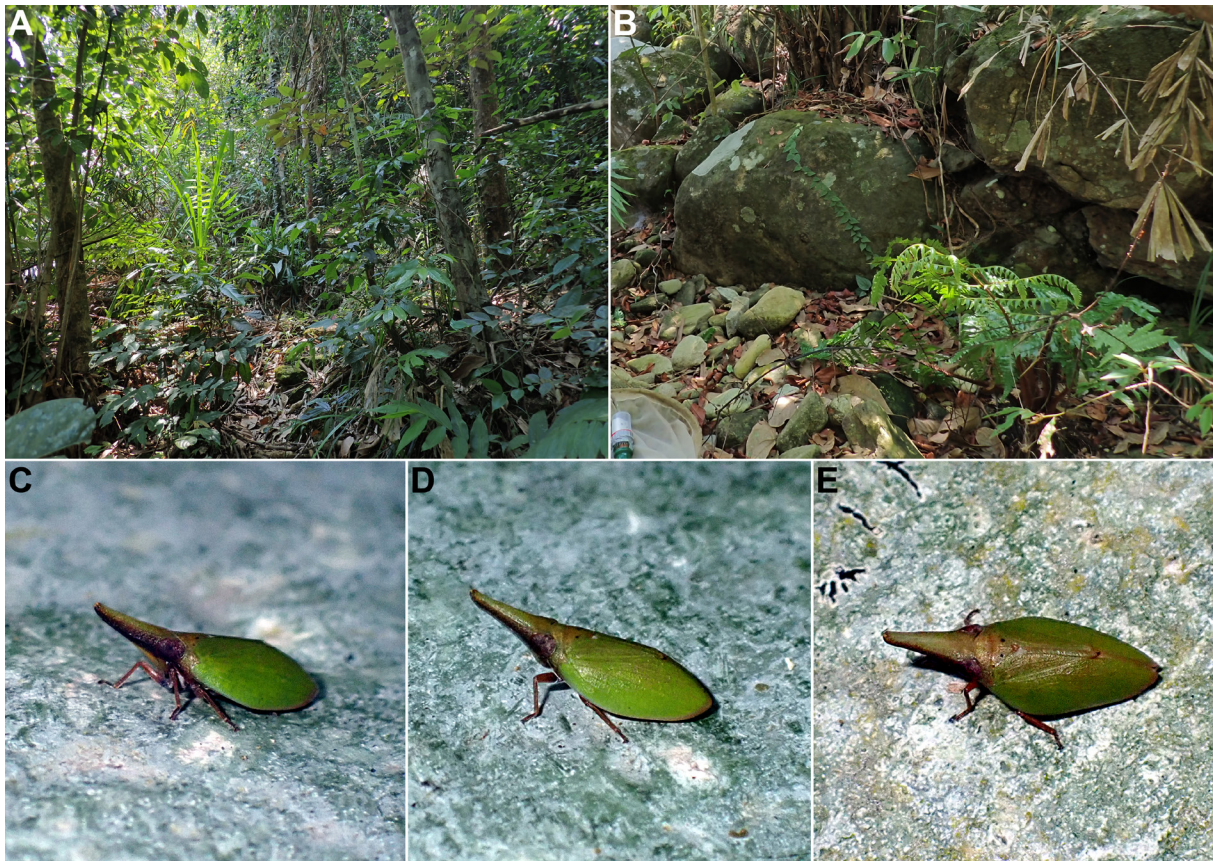


Fig. 27. *Pseudochoutagus lindae* sp. nov. in Bach Ma National Park, Yes Hue Eco, 17 May 2023. A. Habitat. B. Host plant. C–E. Live specimen.

ABDOMEN (Fig. 24B). Yellowish brown, middle portion of basal segments dark brown.

MALE TERMINALIA. Pygofer (*Py* – Fig. 26A–D) about 2.3 times as high as long in lateral view, with anterior and posterior margins subparallel, sinuate; posterior margin with posterodorsal angle nearly right and dorsal margin straight; in dorsal view, posterior margin very deeply and abruptly excavate. Gonostyli (*G* – Fig. 26A–B, D) (in lateral view) longer than high (without dorsal capitulum), tapering posteriorly in a distinct lobe narrowly rounded apically, and concave; capitulum (*ca*) with wide neck, curved laterad and directed posterodorsad, with distal portion obliquely flattened, and with outer margin under lateral laminate projection, strongly concave in caudal view. Aedeagus (Fig. 26 E–L) mostly symmetrical, except for lateroventral processes (*lvp*), rather strongly curved dorsad (in lateral view), longer and wider than ventral lobe of periandrium, and with pair of posterolateral pointed processes directed cephalad; pair of elongate lateroventral processes (*lvp*) directed mesocephalad at about half length, more or less regularly tapering to narrowly pointed apex not reaching base of aedeagus and twisted near base, right process more or less straight, left process moderately curved mesad, and both curved mesad at distal $\frac{3}{4}$; ventral lobe of periandrium (*vl*) evenly widening posterior to medioventral processes, with apical margin rounded with small round projection in middle; dorsal lobe (*dl*) with median ridge in distal portion, sinuate in lateral view. Connective (*co*) elongate, weakly curved, with massive tectiductus (*te*). Anal tube (*An* – Fig. 26A–D) dorsoventrally flattened, in dorsal view spatulate with apical margin roundly emarginate; basal portion narrow, widening to strong sinuation at level of anal opening; distal portion weakly tapering to lateroposterior rounded angles; in lateral view, strongly curved near base, then gently curved posteroventrad; anal opening at about midlength.

FEMALE TERMINALIA. Hind margin of sternum VII (*St VII* – Fig. 25F) with massive, widely spatulate, apically weakly concave median process.

Biology

Pseudochoutagus lindae sp. nov. was collected in May in a marshy microhabitat (Fig. 27A) along a stream by sweeping a fern (Fig. 27B), in moist evergreen tropical forest at about 250 m in altitude. The green colour of adult specimens (Fig. 27C–E) probably helps their camouflage on their host plants.

Distribution

Vietnam: Thừa Thiên-Huế Province, Bach Ma National Park (Fig. 1).

Pseudochoutagus trungi sp. nov.

[urn:lsid:zoobank.org:act:03D78B1D-CBE7-44E5-8612-5655B6C7710B](https://zoobank.org/urn:lsid:zoobank.org:act:03D78B1D-CBE7-44E5-8612-5655B6C7710B)

Figs 1, 28–31

Diagnosis

Pseudochoutagus trungi sp. nov. can be recognized by:

- (1) the variegated brown general colour of the insect, with distinctly darker, black-brown frons (Fig. 28A–C);
- (2) the robust cephalic process, with vertex about 1.9 times as long in midline as wide (Fig. 29A).

Differential diagnosis

The closest species is *P. rubens* (see illustrations in Constant 2021: fig. 5) which differs by a much longer cephalic process, with vertex 2.7 times as long in midline, as wide (1.9 times in *P. trungi* sp. nov.) and frons 2.9 times as long in midline as wide (2.1 times in *P. trungi*), and by the frons not distinctly darker than the sides of head and vertex.

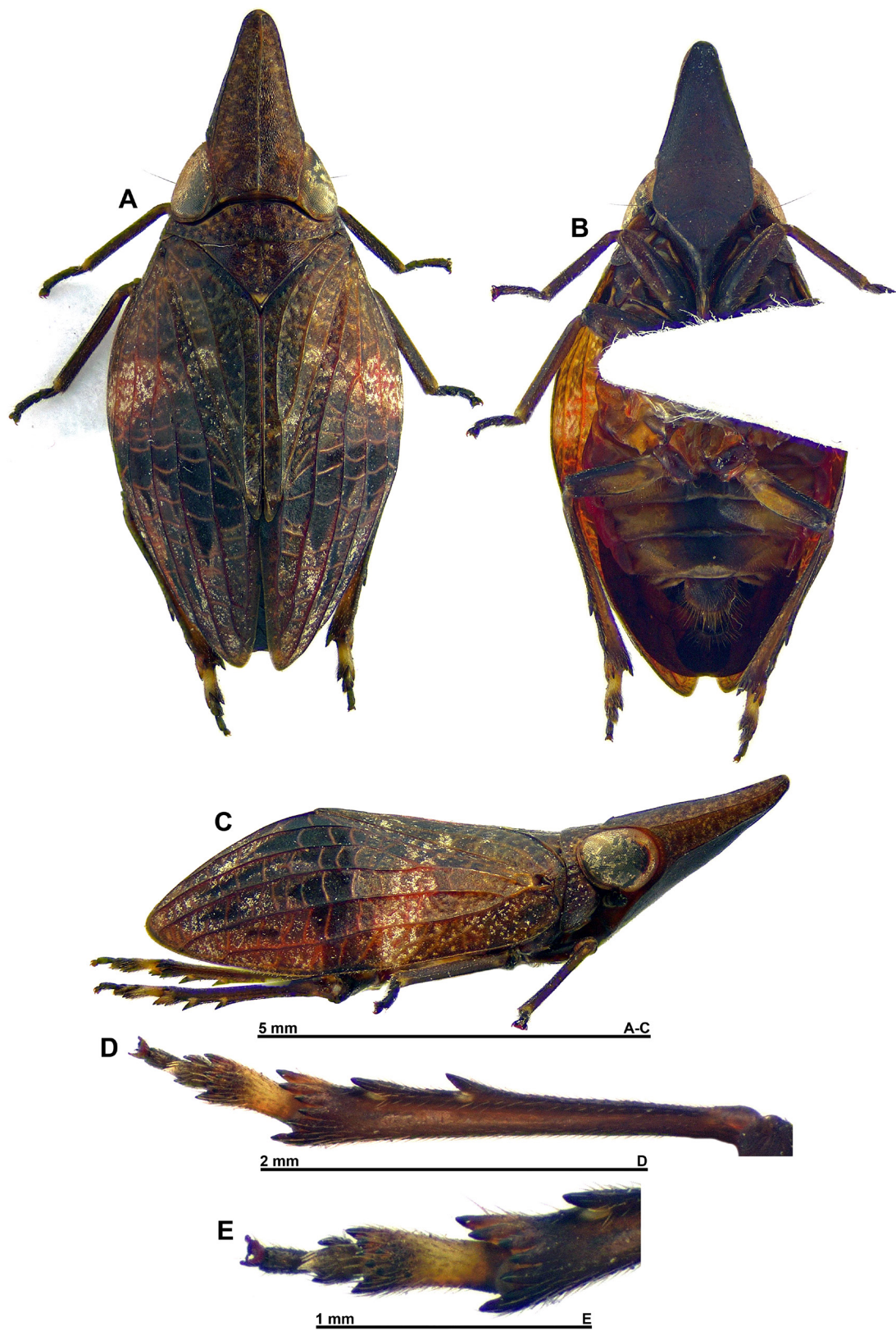


Fig. 28. *Pseudochoutagus trungi* sp. nov., holotype ♀ (VNMN). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Right hind leg, ventral view. **E.** Metatarsus and apex of metatibia, ventral view.

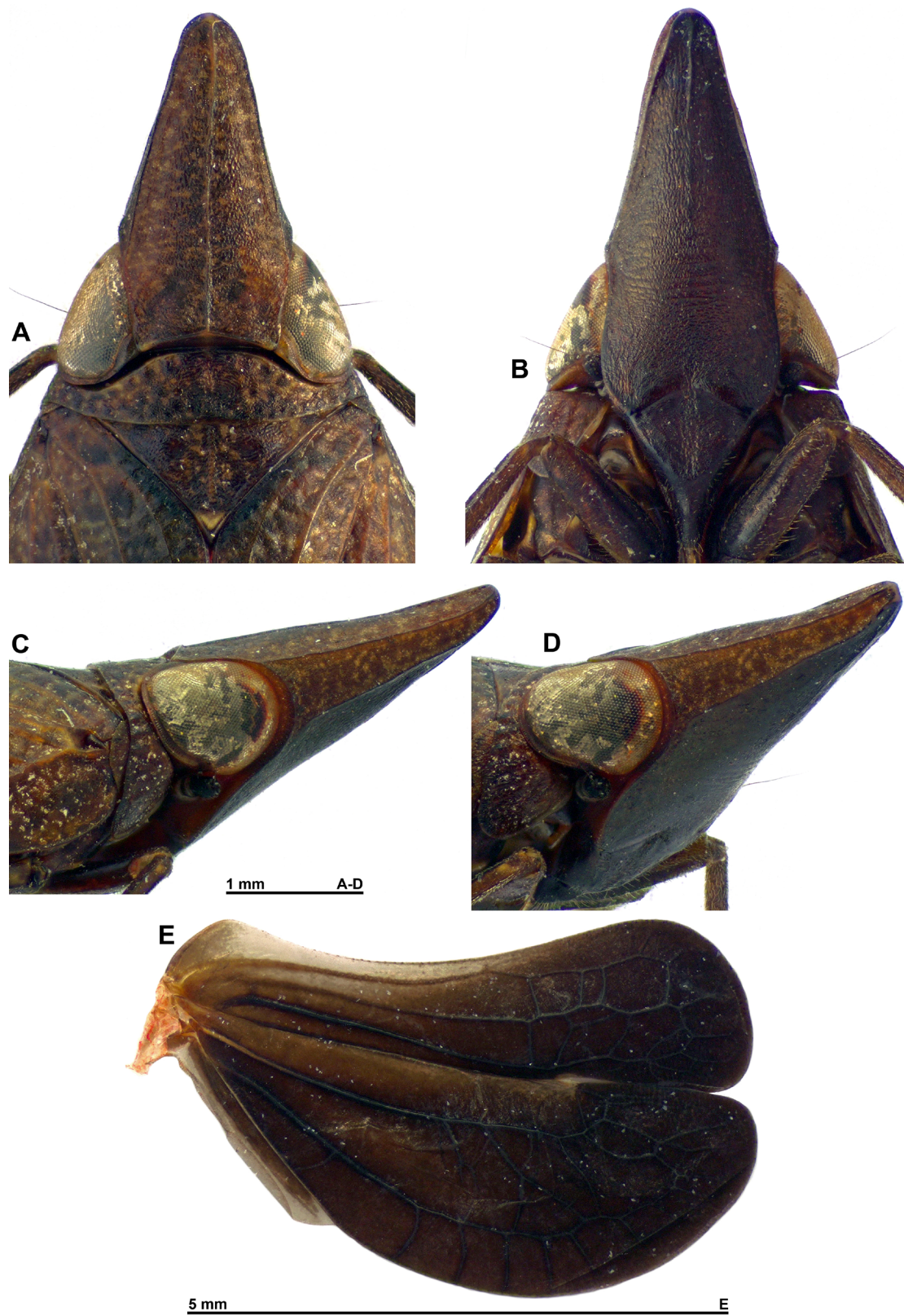


Fig. 29. *Pseudochoutagus trungi* sp. nov., holotype ♀ (VNMN). **A.** Head and thorax, dorsal view. **B.** Frons, perpendicular view. **C.** Head and thorax, lateral view. **D.** Head and thorax, anterolateral view. **E.** Right hind wing.

Etymology

The species epithet is a patronym dedicated to Trung Vu Thanh who found the first specimen of this species in the field during our 2023 expedition.

Type material

Holotype

VIETNAM • ♀ (Figs 28–30); Thừa Thiên-Huế Province, Phong Dien District; 16°30'27" N, 107°16'05" E; 23 May 2023; 350–400 m a.s.l.; V.T. Trung leg.; VNMN.

Paratypes

VIETNAM • 2 ♀♀; same data as for holotype; J. Constant and L. Semeraro leg.; I.G.: 34.640; RBINS.

Description

MEASUREMENTS AND RATIOS. LT: ♀ (n = 3): 8.5 mm; LT/BB = 2.22; LTg/BTg = 2.15; LW/BW = 1.57; BV/LV = 0.53; LF/BF = 2.10.

HEAD (Fig. 29A–D). Strongly elongated anteriorly in cephalic process; vertex variegated brown; distinctly longer in midline than broad before eyes (about 1.9 times), widening from base to anterior margin of eyes, tapering beyond eyes to narrowly rounded apex, median and lateral carinae distinct; posterior margin moderately incurved. Side of head yellow-brown but coloured as vertex on sides of cephalic process. Frons entirely blackish brown, distinctly darker than sides of head and vertex; lateral carinae reaching apex, median carina distinct in distal half; elongate, widest slightly anterior to eyes, roundly tapering towards clypeal suture; clypeal suture rounded. Clypeus black-brown, weakly elevated medially in distal portion. Labium brown with last segment longer than broad, and shorter than penultimate. Antennae dark brown; scape short, ring-shaped; pedicel bulbous.

THORAX (Fig. 29A–D). Pronotum coloured as vertex; nearly $\frac{2}{3}$ of length of mesonotum in midline; anterior margin weakly carinate, sinuate and moderately protruding anteriorly between eyes, with peridiscal carinae indistinct; posterior margin nearly straight; median carina obsolete; weak impressed point on each side of median line; weak, blunt tubercles along anterior and posterior margins; paranotal lobes (lateral view) moderately broad, turning dark brown in lower portion, under level of eye and with posteroventral angle rather narrowly rounded. Mesonotum coloured like vertex with longitudinal

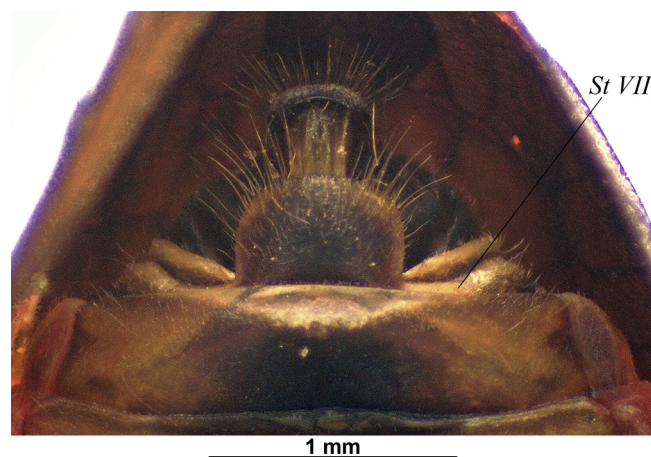


Fig. 30. *Pseudochoutagus trungi* sp. nov., holotype ♀ (VNMN). Terminalia, ventral view. Abbreviation: see Material and methods.

carinae very weak and blunt; two weakly impressed points on disc; tip of scutellum pale yellow. Tegulae dark brown.

TEGMINA (Figs 28A–C, 31C–F). Dark brown, washed with olivaceous in basal portion, black transverse band just beyond midlength, at about basal $\frac{1}{3}$, transverse band of white wax, apical $\frac{1}{3}$ covered in white wax, basal $\frac{1}{3}$ with scattered small points of white wax; veins concolourous except in black band, where red; subcoriaceous with longitudinal veins distinct and with dense reticulum of veinlets; shape elongate

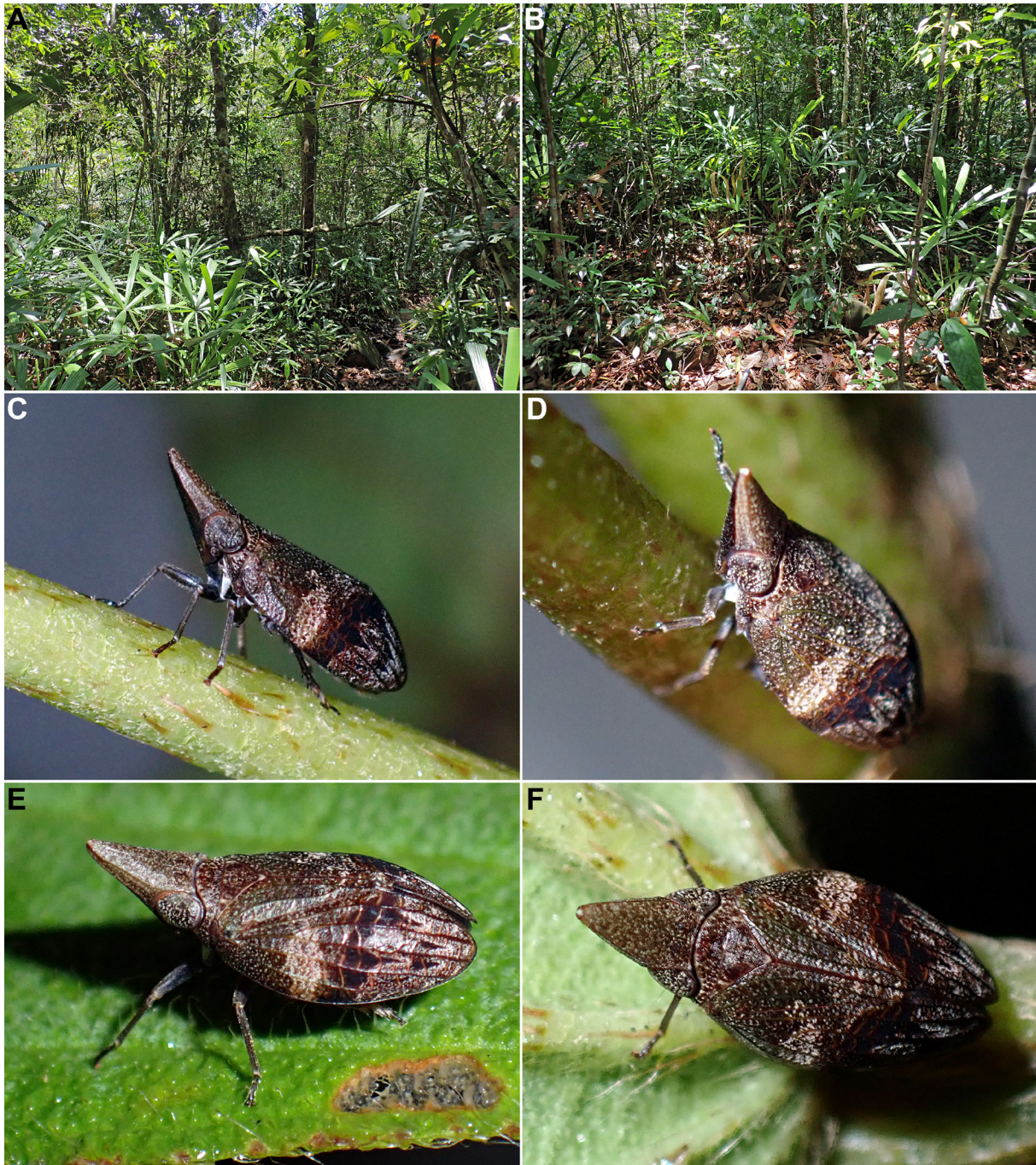


Fig. 31. *Pseudochoutagus trungi* sp. nov. in Phong Dien District, 17 May 2023. A–B. Habitat. C–F. Live specimen (photographed in cage).

and convex with sides broadly rounded, widest at basal $\frac{1}{3}$, about 2.5 times as long as broad; narrowly rounded apically. Postclaval margin nearly straight, very weakly rounded on distal half, and notched at apex of clavus. Clavus closed, reaching about $\frac{2}{3}$ of tegmen. Venation: ScP+R forking close to base after short common stem, ScP+RA and RP unforked, running more or less parallel to costal margin in a large basal portion; MP forked slightly before basal $\frac{1}{3}$, resulting veins unforked, running more or less parallel; CuA weakly diverging from claval joint; Pcu and A_1 fused at distal $\frac{1}{4}$ of clavus, resulting Pcu+ A_1 reaching claval joint before apex of clavus; dense reticulum of veinlets, especially after basal $\frac{1}{3}$.

HIND WINGS (Fig. 29E). Black-brown, slightly paler along costal margin in basal half; venation concolourous; wing broader than tegmen and deeply bilobed at CuP; costal margin sinuate; CuP-Pcu- A_1 lobe broadly rounded along postclaval margin and about 1.3 times as wide as Sc-R-MP-CuA lobe, both about the same length and apically rounded; A_2 lobe moderately reduced and narrow. Venation: longitudinal veins ScP-R-MP-Cu well distinct; Pcu and A_1 separated; numerous cross-veins; A_2 rather weak.

LEGS (Fig. 28A–E). Moderately elongate, slender; brown with apex of pro- and mesotibiae, posterobasal portion of metafemora and basal half of first segment of metatarsi, yellowish; femora wider than corresponding tibiae; metatibiae with two lateral spines in distal half and seven apical spines. Metatibiotarsal formula: (2) 7 / 9 / 2.

ABDOMEN (Fig. 28B). Yellowish brown with dark brown median marking.

FEMALE TERMINALIA. Hind margin of sternum VII with massive, long, apically rounded median process (*St VII* – Fig. 30).

Biology

Pseudochoutagus trungi sp. nov. was collected in May in a marshy microhabitat (Fig. 31A) by sweeping the lower vegetation (mostly ferns and palms) (Fig. 31B), in moist evergreen tropical forest at about 350 m in altitude. The variegated brown colour of adult specimens (Fig. 27C–F) probably helps their camouflage on their host plants.

Distribution

Vietnam: Thừa Thiên-Huế Province, Phong Dien district (Fig. 1).

Genus *Pusulissus* Bourgoïn & Wang, 2020

Pusulissus Bourgoïn & Wang, 2020: 73. Type species: *P. phiaoacensis* Bourgoïn & Wang, 2020, by original designation.

Flatiforma Meng, Qin & Wang, 2020 in Zhang *et al.* 2020: 353. Type species: *F. guizhouensis* Meng, Qin & Wang, 2020, by original designation. Synonymized by Gnezdilov 2022: 47.

Pusulissus – Constant & Pham 2024: 51 (diagnosis, notes).

Diagnosis

The genus *Pusulissus* can be differentiated from all other genera of Parahiraciina by the following combination of characters:

- (1) the elongate frons (at least 1.2 times as long in midline as wide) with median carina extending from dorsal margin almost to frontoclypeal suture and without a black tubercle in the middle of the disc;
- (2) the tegmina distinctly widest in the basal $\frac{1}{3}$, not subparallel nor regularly rounded;
- (3) the vertex with anterior margin in dorsal view only very slightly angularly convex or straight;

- (4) the anal tube of male dorsoventrally flattened and wide at midlength;
- (5) the aedeagus rather simple, with a single pair of ventral processes curved anterodorsad.

Note

Two species of *Pusulissus* are currently known from Vietnam: *P. phiaoacensis* Bourgoïn & Wang, 2020 from Cao Bang Province and *P. quangninhensis* Constant & Pham, 2024 from Quang Ninh Province. An additional record of the genus, from Vinh Phuc Province, was provided, based on an incomplete female specimen (Bourgoïn & Wang 2020; Constant & Pham 2024).

Species included

Pusulissus bachmaensis sp. nov.

Pusulissus coronomensis Bourgoïn & Wang, 2020 (China (Guangxi) – Bourgoïn & Wang 2020)

Pusulissus guizhouensis (Meng, Qin & Wang, 2020) (China (Guizhou) – Zhang *et al.* 2020)

Pusulissus menglaensis (Che, Zhang & Wang, 2020) (China (Yunnan) – Zhang *et al.* 2020)

Pusulissus phiaoacensis Bourgoïn & Wang, 2020 (Vietnam (Cao Bang Province) – Bourgoïn & Wang 2020)

Pusulissus quangninhensis Constant & Pham, 2024 (Vietnam (Quang Ninh Province) – Constant & Pham 2024)

Pusulissus ruiliensis (Che, Zhang & Wang, 2020) (China (Guangxi, Yunnan) – Zhang *et al.* 2020)

Pusulissus bachmaensis sp. nov.

[urn:lsid:zoobank.org:act:541CA790-5C5F-4407-BA9A-099000E2154E](https://zoobank.org/urn:lsid:zoobank.org:act:541CA790-5C5F-4407-BA9A-099000E2154E)

Figs 1, 2D, 32–35

Diagnosis

Pusulissus bachmaensis sp. nov. can be recognized by:

- (1) the frons elongate, distinctly constricted between eyes (Fig. 33B);
- (2) the anal tube in dorsal aspect widely spatulate with distal portion nearly circular, nearly 1.3 times as long in midline as wide with apical margin shortly truncate in middle, without distinct lateral flaps (*An* – Fig. 34A–D);
- (3) the neck of the capitulum of the gonostyli rather short, less high than head of capitulum (*ca* – Fig. 34A);
- (4) the shape of the lateroventral processes of the aedeagus slightly inflated basally, then constricted, directed cephalad and moderately, evenly upcurved, remaining under the ventral lobe of the perianthium and reaching to basiventral lobes of perianthium; distal portion tapering and curved mesad (*lvp* – Fig. 34F–K).

Differential diagnosis

Pusulissus bachmaensis sp. nov. can be separated from *P. coronomensis*, *P. guizhouensis*, *P. phiaoacensis* and *P. quangninhensis* by the round shape of the anal tube without lateral flaps (anal tube more or less rhomboidal with lateral flaps projecting ventrad in all three other species). The constricted frons between eyes and the rather strongly curved aedeagus in lateral aspect, also separates *P. bachmaensis* from *P. menglaensis* and *P. ruiliensis*, which do not show a distinct constriction of the frons between the eyes, and have a much less curved aedeagus; *P. bachmaensis* also differs from the two latter species by its subparallel, slender lateroventral processes of the aedeagus reaching before basiventral lobes of the ventral lobe of the perianthium, the processes being longer (reaching to middle of lobe), more robust and curved mesad in distal half in *P. menglaensis*, shorter and overlapping ventrally in *P. ruiliensis*.

Etymology

The species epithet refers to Bach Ma National Park, where the species was discovered.

Type material

Holotype

VIETNAM • ♂ (Figs 32–34); [Thừa Thiên-Huế Province], Bach Ma National Park, summit; 16°12' N, 107°52' E; [1300–1400 m a.s.l.]; 15–16 Jul. 2011; J. Constant and J. Bresseel leg.; day [time] collecting; I.G.: 31.933; RBINS.

Paratype

VIETNAM • 1 ♀ (Fig. 35); Thừa Thiên-Huế Province, Bach Ma National Park, summit; 16°11'18" N, 107°50'56" E; 1300–1400 m a.s.l.; 11–21 May 2023; J. Constant and L. Semeraro leg.; VNMN.

Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 7.0 mm, ♀ (n = 1): 7.8 mm; LT/BB = 1.48; LTg/BTg = 2.08; LW/BW = 1.43; BV/LV = 2.35; LF/BF = 1.19.

HEAD (Fig. 33A–D). Vertex variegated brown with anterior angles black, distinctly broader than long in midline and with lateral margins longer than midline, with all margins carinate; anterior margin nearly straight with median carina of frons distinct in middle, posterior margin deeply concave, angularly rounded, and lateral ones subparallel; disc shallowly excavate with obsolete median carina. Side of head yellowish brown with black marking at anterodorsal angle extending on a distance along anterior margin, darker area between anteroventral portion of eye and anterior margin, followed by pale yellowish area extending to base of antenna and anterior margin of gena; pale yellowish marking along clypeal suture; anteroventral angle moderately projecting anteriorly in a small round lobe. Frons elongate and generally smooth, variegated brown with dorsal angles blackish, distinct yellowish spot in middle on each side of median carina and more or less distinct yellowish band along frontoclypeal suture; median carina extending from dorsal margin down nearly to rounded frontoclypeal suture, brown on disc; no distinct row of tubercles along dorsal and lateral margins; dorsal margin distinctly concave, lateral margins distinctly sinuate. Clypeus variegated dark brown, weakly elevated medially. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, yellowish; pedicel bulbous, yellowish brown.

THORAX (Fig. 33A, C–D). Pronotum variegated yellowish brown; about 0.6 times as long as mesonotum in midline; anterior margin carinate, strongly, angularly protruding anteriorly between eyes, with carinae directed obliquely posteriorly, not reaching hind margin of pronotum; posterior margin almost straight, raised; no median carina but with impressed point on each side of median line; lateral portion behind eye very narrow, laminate; blunt, pale yellowish tubercles scattered on disc with row following anterior margin, and on outer margin of paranotal lobes; paranotal lobes (lateral view) broad, brown in outer portion, pale yellowish in inner portion and with large black marking behind lower portion of eye, and with posteroventral angle straight. Mesonotum variegated yellowish brown with longitudinal carinae obsolete but marked by dark brown lines; smooth, slightly depressed before scutellum; scutellum paler; nearly complete transverse carina along anterior margin. Tegulae brown.

TEGMINA (Figs 32A–C, 35A–C). Variegated yellowish brown (greener in live specimens); subcoriaceous with longitudinal veins yellow brown, elevated and with a dense reticulum of pale yellow veinlets; shape elongate and convex with sides broadly rounded, widest at basal $\frac{1}{3}$, about 2.1 times as long as broad; narrowly rounded apically. Postclaval margin weakly rounded on distal half and weakly notched at apex of clavus. Clavus closed, reaching slightly over midlength of tegmen. Venation: ScP+R forking close to base after rather short common stem, ScP+RA and RP running more or less parallel to costal margin and not forked; MP forked rather close to base after common stem, resulting veins both forked again further; CuA simple, sinuate, more or less parallel to claval joint, then to sutural margin and merging with latter before apex of tegmen; Pcu and A₁ fused at apical $\frac{1}{3}$ of clavus, resulting Pcu+A₁ reaching apex of clavus.

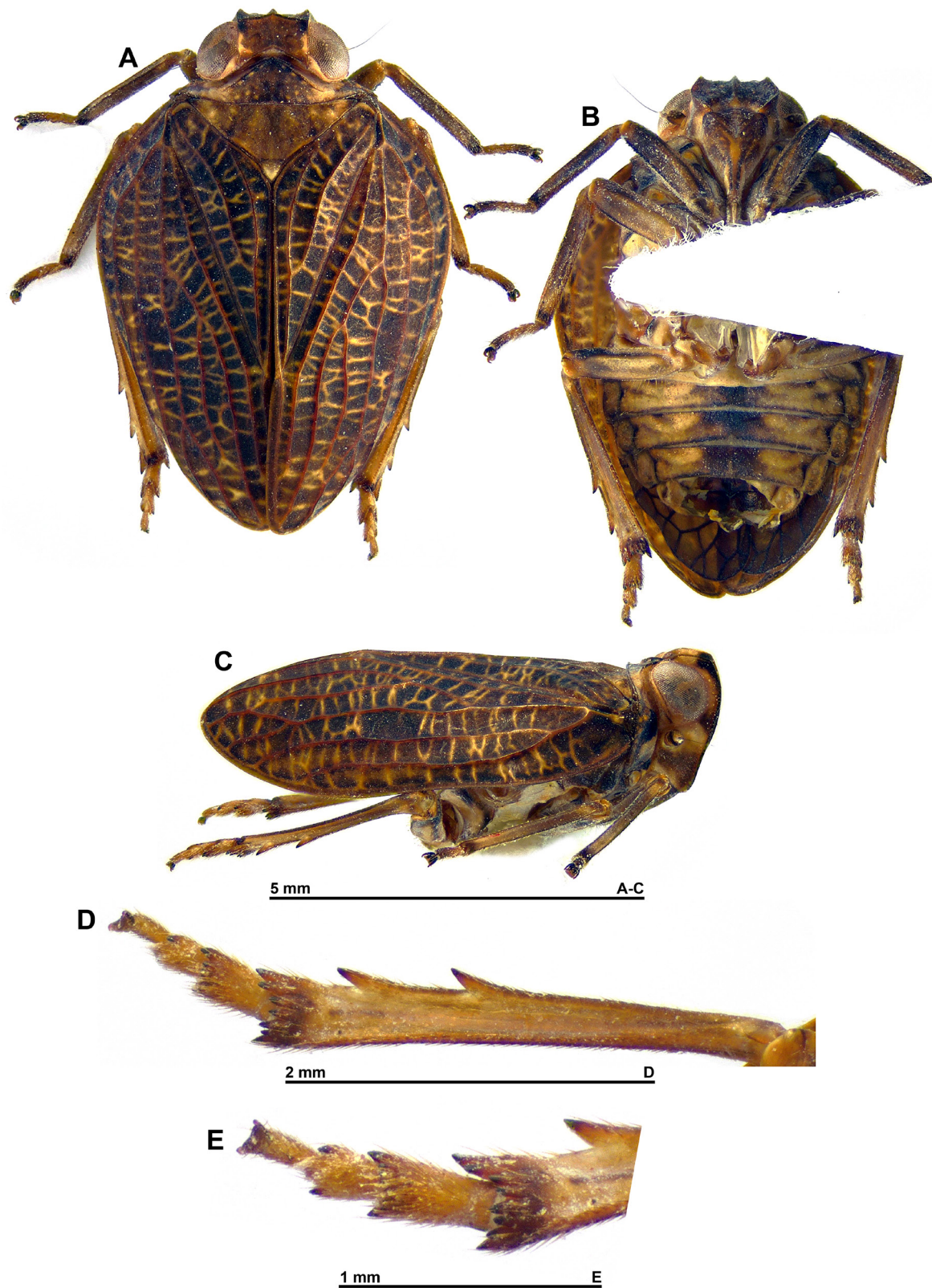


Fig. 32. *Pusulissus bachmaensis* sp. nov., dissected holotype, ♂ (RBINS). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Right hind leg, ventral view. E. Metatarsus and apex of metatibia, ventral view.

HIND WINGS (Fig. 33E). Brown with large basicostal portion of lobe Sc-R-MP-CuA and base of lobe CuP-Pcu-A₁ yellow-brown; venation darker than corresponding background; wing broader than tegmen and deeply bilobed at CuP; costal margin moderately sinuate; CuP-Pcu-A1 lobe broadly rounded along

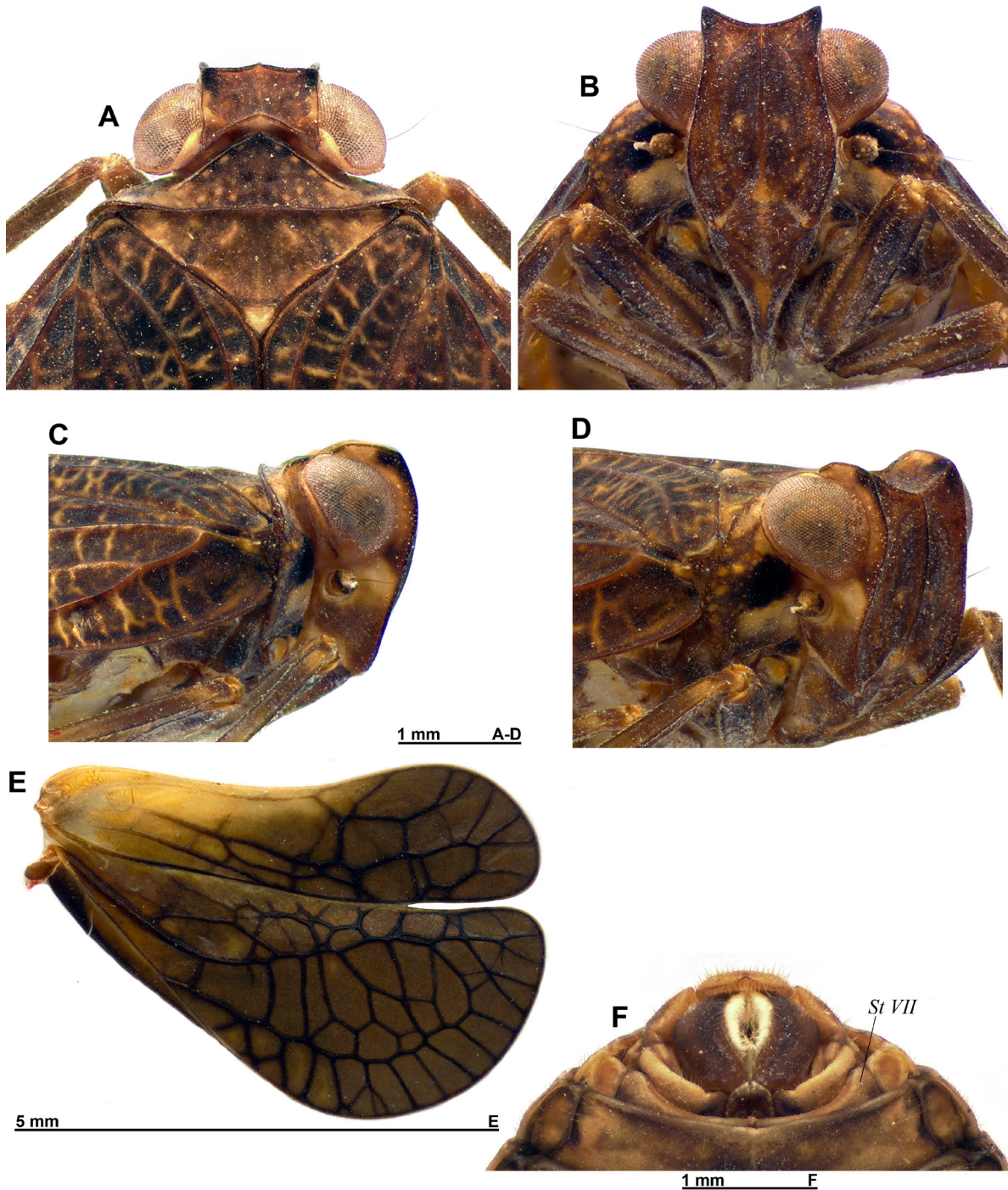


Fig. 33. *Pusulissus bachmaensis* sp. nov. **A–E.** Holotype ♂ (RBINS). **A.** Head and thorax, dorsal view. **B.** Frons, perpendicular view. **C.** Head and thorax, lateral view. **D.** Head and thorax, anterolateral view. **E.** Right hind wing. **F.** Paratype ♀ (VNMN), terminalia, ventral view. Abbreviations: see Material and methods.

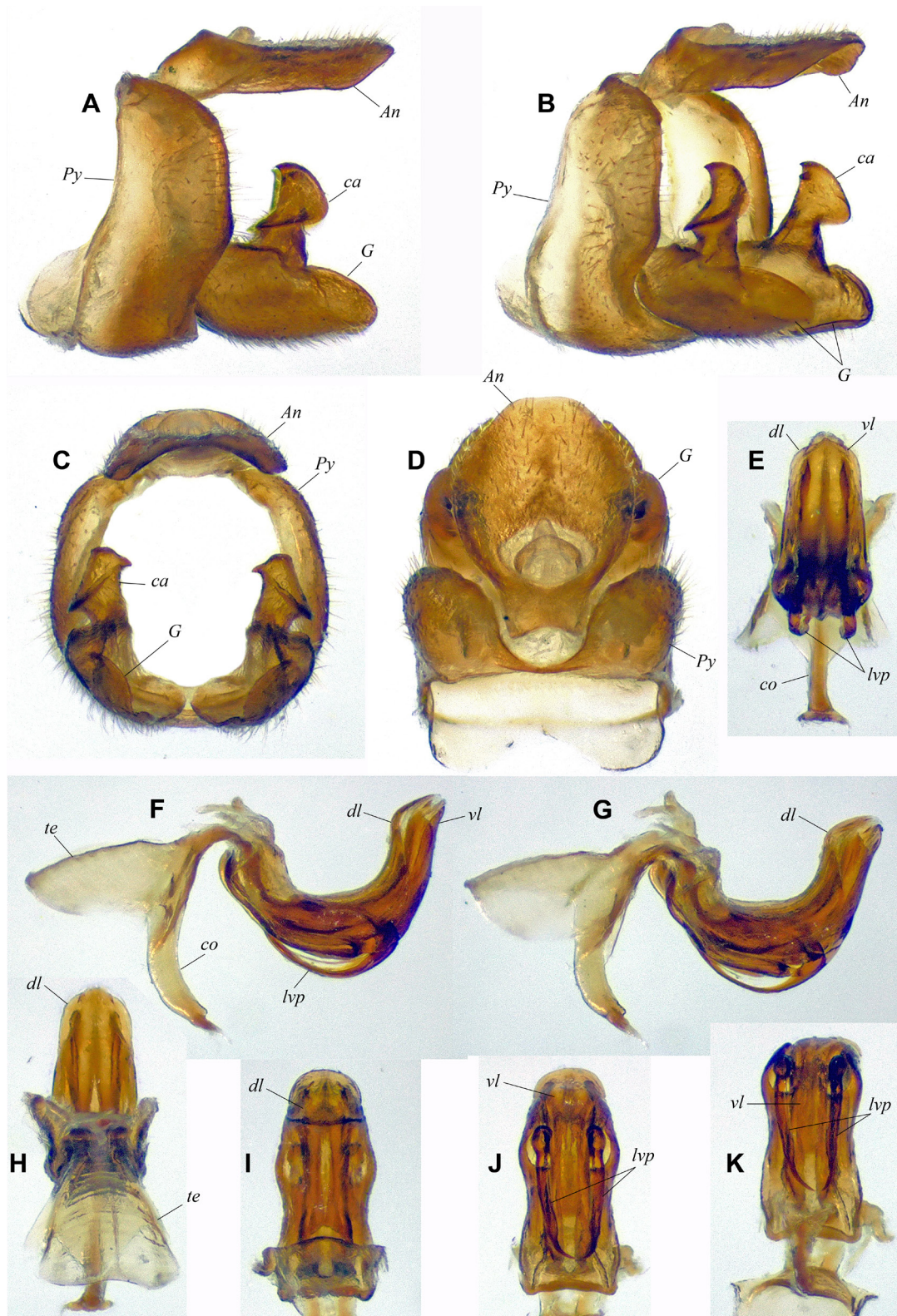


Fig. 34. *Pusulissus bachmaensis* sp. nov., holotype, ♂ (RBINS). **A–D.** Pygofer, anal tube and gonostyli. **A.** Left lateral view. **B.** Posterolateral view. **C.** Caudal view. **D.** Dorsal view. **E–L.** Aedeagus. **E.** Posteroventral view. **F.** Left lateral view. **G.** Left laterodorsal view. **H.** Anterodorsal view. **I.** Dorsal view. **J.** Ventral view. **K.** Anteroventral view. Abbreviations: see Material and methods.

postclaval margin and about 1.5 times as wide as Sc-R-MP-CuA lobe; both lobes approximately the same length, angularly rounded at apex; A2 lobe reduced and narrow. Venation: longitudinal veins ScP-R-MP-Cu well distinct; Pcu and A₁ separated; numerous cross-veins; A2 indistinct.

LEGS (Fig. 32A–E). Moderately elongate and slender, yellowish brown femora darker than corresponding tibiae; apex of femora and base and pro- and mesotibiae yellowish; posterior margin of pro- and mesofemora with row of acute irregular minute teeth. Metatibiae with 2 lateral spines in distal half and 8 apical spines. Metatibiotarsal formula: (2) 8 / 8 / 2.

ABDOMEN (Fig. 32B). Yellowish with wide, black brown band in middle.

MALE TERMINALIA. Pygofer (*Py* – Fig. 34A–D) about 2.2 times as high as long in lateral view, with anterior margin sinuate and posterior margin more or less straight in middle portion, rounded to posterodorsal angle, and obliquely excavate in ventral 1/3; posterior margin dorsally deeply excavate (U-shaped excavation). Gonostyli (*G* – Fig. 34A–C) (in lateral view) strongly elongate (without dorsal capitulum), projecting posteriorly in a distinct elongate lobe rounded apically, and concave; capitulum (*ca*) with neck rather short and wide, less high than head of capitulum, with head massive, falcate in lateral view with apical hook directed cephalad, with strong tooth on inner margin directed mesad, and with lateral laminate projection in dorsal half with outer margin under it strongly concave in caudal view. Aedeagus (Fig. 34E–K) symmetrical, rather strongly curved dorsad (in lateral view), but with distal 1/4 more or less straight; pair of elongate lateroventral processes (*lvp*) slightly inflated basally, then constricted, directed cephalad and moderately, evenly upcurved, remaining under ventral lobe of periandrium and reaching to basiventral lobes of periandrium; distal portion tapering and curved mesad; ventral lobe of periandrium

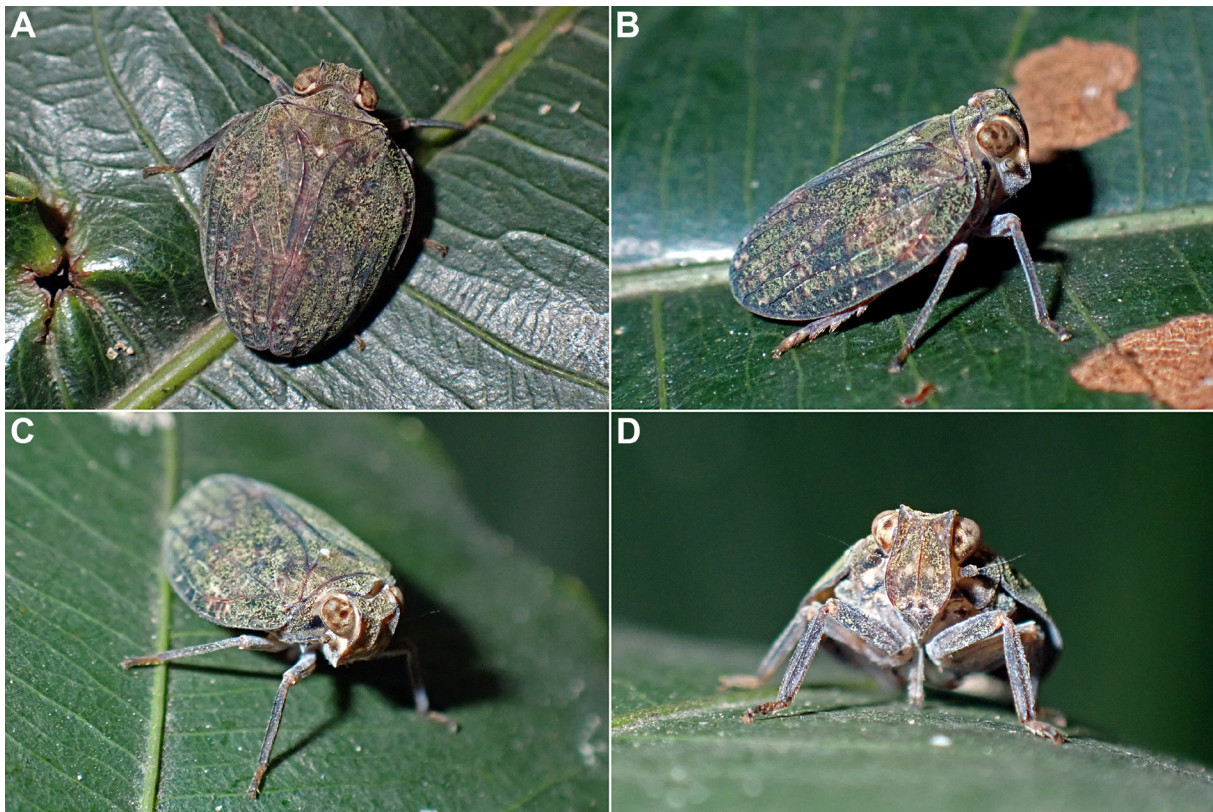


Fig. 35. *Pusulissus bachmaensis* sp. nov., paratype, ♀ (VNMN) from Bach Ma National Park, summit, 21 May 2023. A–D. Live specimen (photographed in cage).

(*vl*) with pair of longitudinal basiventral lobe-shaped processes, ventral lobe evenly widening posterior to lateroventral processes, then gently tapering to generally rounded apical margin with small acutely rounded projection in middle. Connective (*co*) elongate, curved, with tectiductus (*te*) well developed. Anal tube (*An* – Fig. 34A–D) dorsoventrally flattened, in dorsal view widely spatulate with distal portion nearly circular, nearly 1.3 times as long in midline as wide, with apical margin shortly truncate in middle, without distinct lateral flaps; anal opening at about basal $\frac{1}{3}$.

FEMALE TERMINALIA. Hind margin of sternum VII (*St VII* – Fig. 33F) concave, with middle portion nearly straight; small digitiform process directed posterad, derived from middle of sternum VII and slightly surpassing posterior margin.

Biology

Pusulissus bachmaensis sp. nov. was collected only twice: one male in July 2011 and one female in May 2023, both in montane evergreen tropical forest, at about 1300–1400 m a.s.l., near the summit (Fig. 1D). The specimens were collected on tree trunks densely covered in lichens and mosses (the female was photographed in a cage – Fig. 35). When disturbed, they tend to walk away and hide on the opposite side of the trunk or branch, and jump away as a last solution.

Distribution

Vietnam: Thừa Thiên-Huế Province, summit of Bach Ma National Park (Fig. 1).

Discussion

The present study adds one genus and seven species, all new to science, to the fauna of Issidae planthoppers of Vietnam, which represents a more than 13% increase in the number of species recorded from the country. It also provides the first records of Issidae for Thừa Thiên-Huế Province, which now counts eight species in five genera and becomes the best documented province of Central Vietnam in terms of the Issidae diversity (see Constant & Pham 2024), although the present study deals with a single tribe (more species await description in the other subgroups of Issidae – Constant & Pham, unpubl. data). At country level, only three provinces count more Issidae species, all of them in North Vietnam (Constant & Pham 2024). The new data also greatly extends the distribution of the genera *Gelastyrella*, *Pseudochoutagus* and *Pusulissus* by about 500 km to the south. It is also noteworthy that seven out of the eight species (more than 87%) of Parahiraciini Issidae found in Thừa Thiên-Huế Province so far were undescribed.

Three of the new species, *Cyclopissus corticalis* gen. et sp. nov., *Flavina lami* sp. nov. and *Pusulissus bachmaensis* sp. nov., seem restricted to the cloud forest at the very top of Bach Ma National Park. None of these species were found just 100 m lower at the Rhododendron Trail, despite extensive searching which allowed the collecting of other species like *F. bachmana* sp. nov. and *Gelastyrella litaoensis*.

In terms of environmental management requirements of the treated species, undercollecting/underdocumenting could be confounding assessments. As Parahiraciini are rather small insects, very well camouflaged in their habitat, they could be overlooked by zoologists and ecologists during sampling. Further surveys are required to identify and characterize the microhabitats and accurately determine the biogeography, host plants, and response to disturbance by these planthoppers. This could allow the attribution of a conservation status for these insects without automatically relegating them to the ‘data deficient’ category (e.g., Cardoso *et al.* 2011; Moir & Brennan 2020), emphasising the need of a strict protection of these habitats in order to preserve their unique fauna.

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